

AGRICULTURAL

Chemicals

IN
THIS
ISSUE:

Potash From Canada
Bayer 21/199 for Cattle Grubs
A New Granulator
New Insect Repellents
Gypsy Moth Spray Program
NPFI Holds Spring Meeting
1956 Fungicide Tests
Tetram . . . A New Acaricide

June 1957



NOW...

ACCEPTED

Terraclor

The new soil fungicide for control of soil-borne diseases

for PEANUTS

Southern stem rot, root rot

Southern stem rot and root rot have caused crop losses as high as 50-60%. TERRACLOR is the one chemical that controls these diseases with yield increases running up to 350-500 lbs. per acre of clean peanuts free from soil. TERRACLOR may be applied alone or in combination with land plaster.

TOMATOES • PEPPERS

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ACCEPTED

FOR ... *certain soil-borne diseases of* COTTON • CABBAGE • BROCCOLI
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LETTUCE • ALFALFA • CLOVER • GARLIC • WHEAT SEED • ORNAMENTALS

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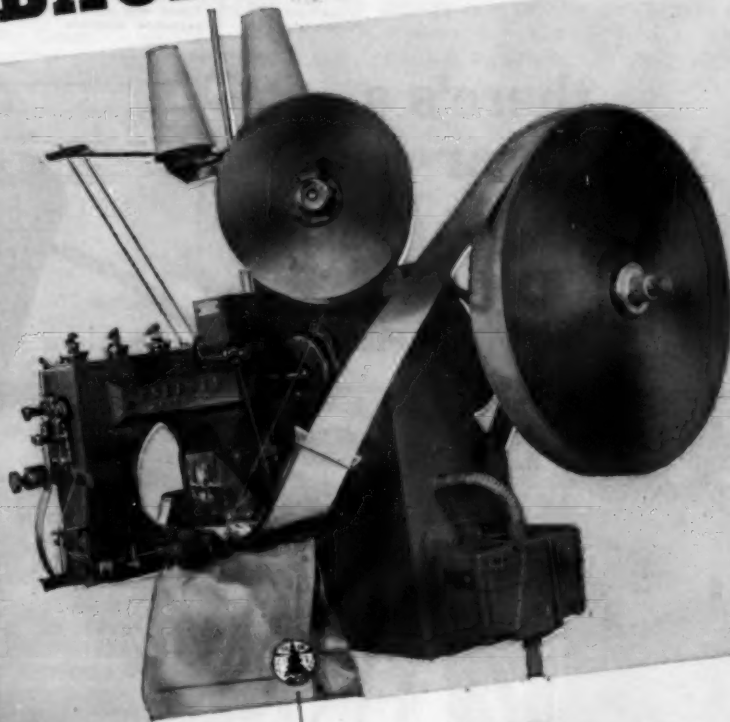
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**HEPTACHLOR CONTROLS FORAGE INSECTS
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This year, Heptachlor will be used more extensively than ever for forage insect control, because Heptachlor provides effective control of forage insects without contaminating milk or meat. Tolerances for the use of Heptachlor on forage and other crops has been established under the Miller Bill, and confirmed by extensive tests. Among these was a special study made by the USDA, in which dairy cattle were fed alfalfa treated with Heptachlor at recommended dosages. Chemical analysis showed no trace of Heptachlor in milk from the test cattle. Heptachlor is such an effective insecticide that minimum amounts have residual effectiveness, yet are safe to use on pasture land and on crops fed to animals.

**HEPTACHLOR KILLS THESE FORAGE INSECTS
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hard year ahead
for hungry
forage insects ...
because of

HEPTACHLOR

News!

Velsicol Chemical
Corporation

will have

Methyl Parathion

available for the

coming cotton

growing season!



This Month's Cover

Photo Meyer Liebowitz

A converted B-18 bomber spraying DDT over Gardiners Island in Gardiners Bay on eastern end of Long Island in USDA Gypsy Moth spray program. See story on page 49-50.

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Vol. 12, No. 6

June, 1957

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PUBLISHED monthly on the 1st, by Industry Publications, Inc.
ADVERTISING and Editorial Office, P. O. Box 31, Caldwell, New Jersey.
PUBLICATION Office: 123 Market Pl., Baltimore, Md.
CHICAGO ADDRESS: P. O. Box 135, Park Forest, Ill. Skyline 6-4459.
ENTERED as second-class matter November 4, 1949 at the Post Office at Baltimore, Md., under the Act of March 3, 1879.
SUBSCRIPTION RATES: United States, 1 year, \$5.00; 2 years, \$9.00. Canada and Pan American countries, 1 year, \$4.00; 2 years, \$7.00. All other foreign countries, 1 year, \$9.00; 2 years, \$15.

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ADVERTISING RATES known on request. Closing date for copy—5th of month preceding month of issue.

Tale Ends

BEFORE we have heard the last of the gypsy moth spray program, the current commotion in the press stirred up by civilian critics of the program may prove to have been just a warm-up for the real hassle. There is more commotion to come, centered around the way in which the spray contracts were awarded and the performance of some of those who were the "successful" bidders.

As we get the story, one spray contractor who was awarded a major share of the work around the New York, New Jersey, Pennsylvania area, based his figures on use of two giant Boeing Strato-cruisers, which incidentally have never been flown for this type job before. They expected to carry about 6,000 gallons of spray per trip, and thus to reduce application costs substantially. As of May 27th, however, only one of these planes had been approved (on May 20th) by CAA, —and the approval was for flying only over non-congested areas, with a limit on the plane load of approximately 3,000 gallons.

As a result, they had treated only about twenty percent of the area by late May, and had found it necessary to subcontract a large portion of the job to another concern, at a very substantial penalty. Timing of spray work for gypsy moth control is of course extremely critical, and substantial sums of money are involved in performance bonds.

More on this subject next month, after we have been able to check with USDA supervisors of the spray project, who were so busy chasing around the area as we closed for press that it was impossible to contact them by phone to get any official comment on progress of the work.

A tremendous spray program will shortly get under way in India and Indonesia under sponsorship of CIA and UNICEF in an attempt to make a big dent in incidence of malaria in the area. Some forty to seventy five million pounds of toxicants will be used, the materials being dieldrin and DDT.

The spruce bud worm spray project will be continued this season in the U. S. Contracts for treating 700,000 acres in Montana, and 600,000 acres in Idaho have been awarded to firms in the Heckathorn group who handled a large part of the job last season also.

Going to the NPFI convention at the Greenbrier, June 10-12? Better pack your bathing suit. A new, handsome outdoor pool down near the golf house has just been added to the hotel's facilities.



*In the
Spotlight
this Month*

- **Cattle Grub Control** . . . Tests with Bayer 21/199 against cattle grubs indicate this insecticide applied dermally in advance of the grub season functions as a systemic, preventing subsequent damage. ET-57 failed to prevent migration of cattle grubs. Page 36.
- **The Sackett Star** . . . Production and operating results of a new type granulator installed at Fertilizer Manufacturing Cooperative. Comparison of the new granulator with a conventional granulator. Page 42.
- **New Insect Repellents** . . . Wide interest being shown in diethyl toluamide, tabutrex, MGK R-11 and MGK R-326 as insect repellents. A broader field of sale developing as new and more effective products reach the market. Page 45.
- **Potash Deposits** . . . American fertilizer manufacturers may shortly expect alternate source of potash from deposits in Saskatchewan, western Canada. Potash Company of America and International Mineral & Chemical Corporation are already sinking shafts for potash mining. Page 34.
- **Gypsy Moth Spray Program** . . . The campaign to halt the spread of the gypsy moth is continuing despite opposition from scattered groups in spray area. Program covers parts of New York, New Jersey, and Pennsylvania. Page 49.
- **Land O'Lakes Fertilizer Plant** . . . A TVA continuous ammoniation and granulation system installed last year at Minneapolis is now in production. Picture tour of this new fertilizer plant. Page 38.
- **Tetram** . . . A new English acaricide shows promise for control of citrus pests and red spider mite on fruit and cotton. Page 40.

Take a good look at your multiwall bag!



Like women's bathing suits, multiwall bags also reveal the passing of time.

Is your bag a vivid, modern example of your business vitality... or is it dull, drab and lacking in appeal?

Is your bag the ideal package for your product, in size and construction, or is it a carry-over from the past?

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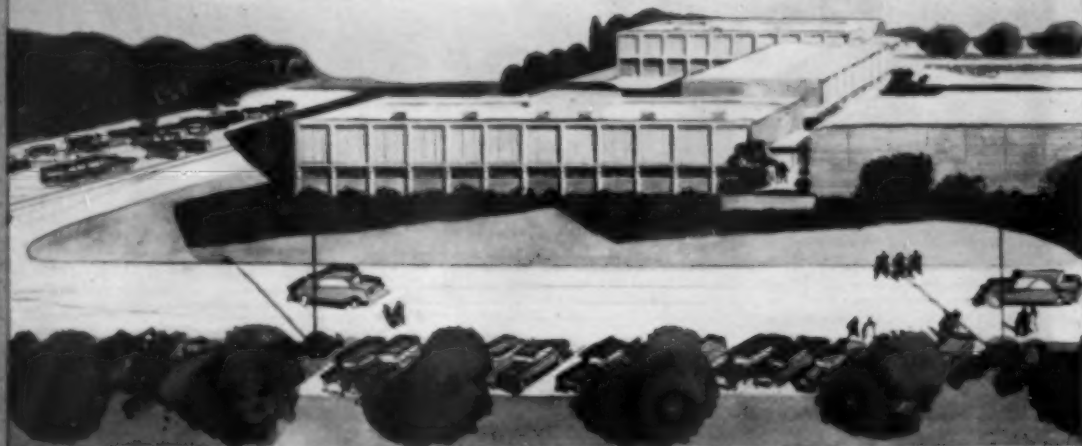
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Artist's conception of Shell Development Company's expanded new Agricultural Research Center at Modesto, Calif.

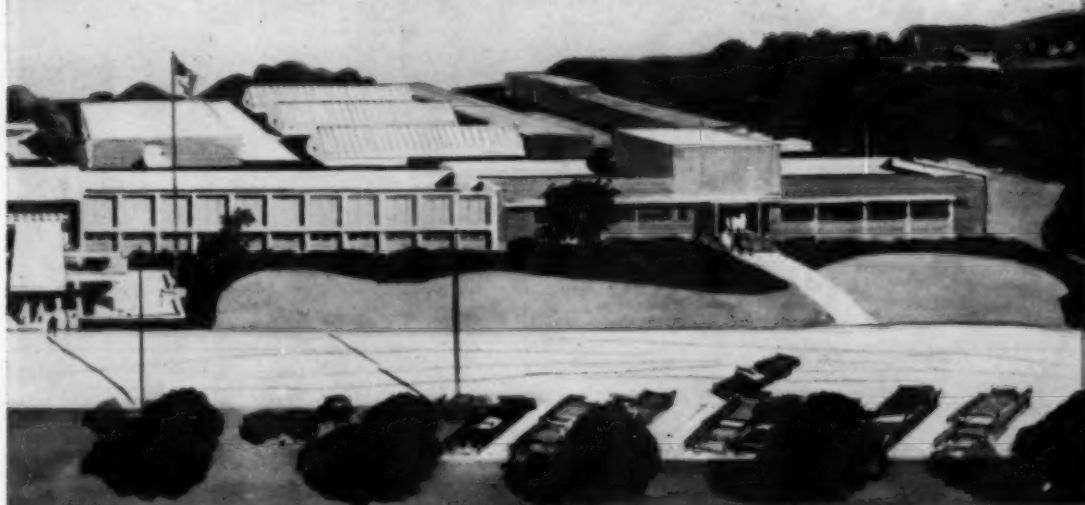
TO STRIKE more powerful blows against agriculture's worst enemy, crop-destroying insects, Shell Development Company is consolidating and expanding its research facilities at Modesto, California.

Upon completion in the fall of 1957, this agricultural research center will rank among the best equipped and most extensive privately maintained

laboratories in the world. A staff of more than 100 will explore every aspect of pesticide research. The new laboratories will be composed of three specialized divisions: Biological Research, Chemical Research, and Product Application.

The research facilities also include a well-established 142-acre experimental farm on which major economic

research center progress in agriculture



crops are grown. This enables Shell researchers to conduct preliminary field tests for the development of new pesticides under actual farming conditions.

Successful pesticides now available from Shell Chemical Corporation include aldrin, dieldrin, endrin, Phos-drin* insecticides; allyl alcohol weed seed killer; D-D* and Nemagon* soil

fumigants. With the addition of the Modesto center, Shell looks forward to the development of better pesticides for even more effective control.

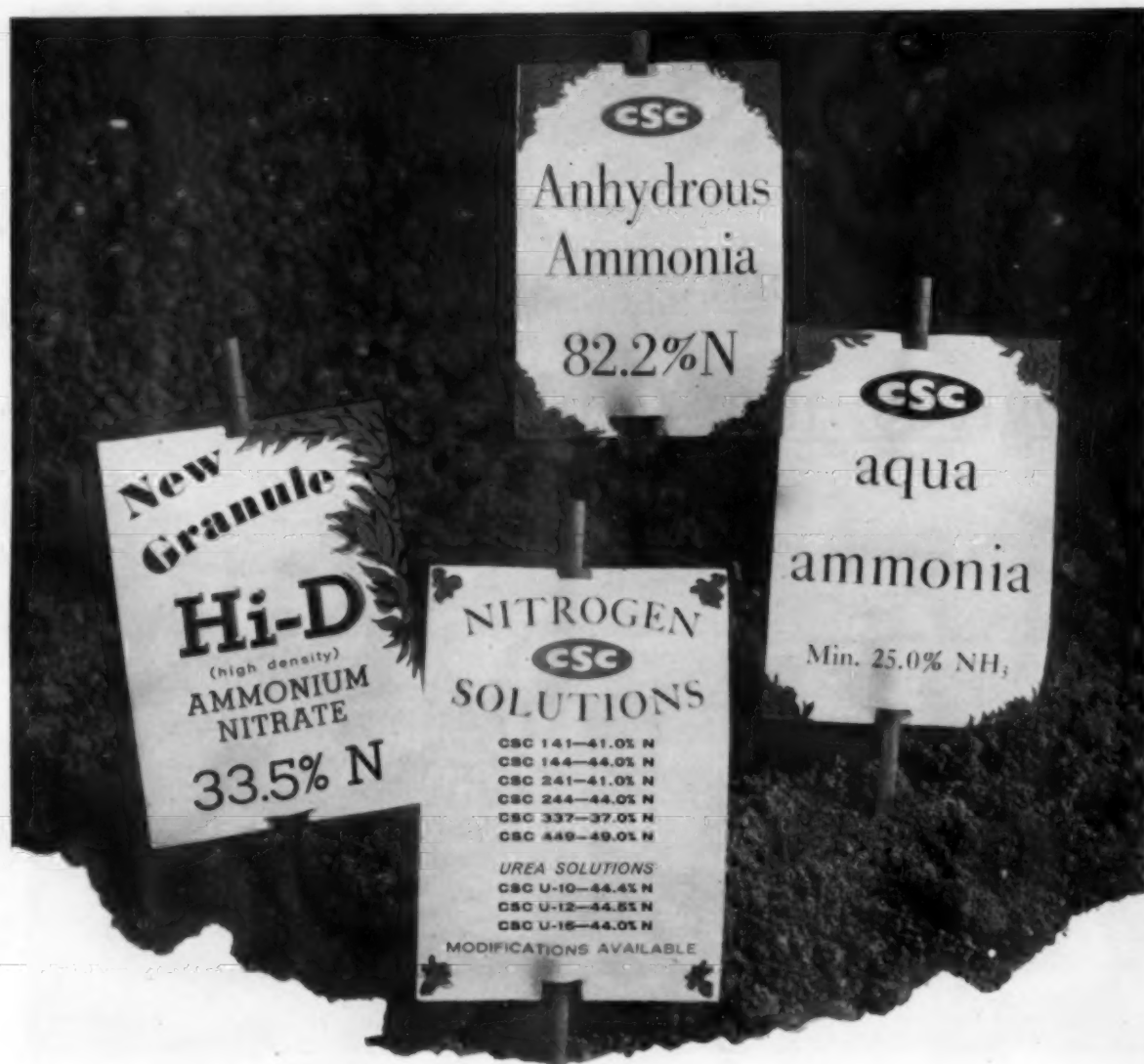
This is one of many ways that Shell Chemical Corporation is helping to build a better tomorrow for agriculture and industry through chemical research today.

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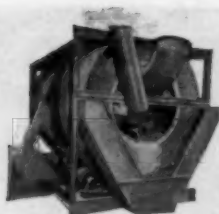
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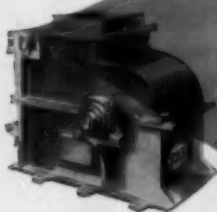
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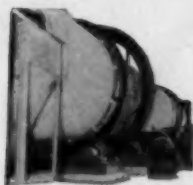
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A performance-proved machine combining the desirable T.V.A. submerged ammoniation design with Sackett time-honored rugged construction. Select the size you need from 15 to 60 tons per hour.



SACKETT BAR MILLS

This is the first mill, to our knowledge, that has been designed specially for use in *cracking* . . . not pulverizing . . . the granular oversize from the final product classifying screen. Its gentle impact action on the material accomplishes desired size reduction with minimum formation of fines.



SACKETT COOLERS

No other manufacturer offers such a complete selection of sizes and capacities. Rugged construction and highly efficient dust control are two of their noteworthy features. Infinite number of diameter and length combinations assure you of just the right one for your capacity and space requirements.

NEW STAR* OF THE SACKETT GRANULATING TEAM

The Sackett STAR* Granulator is an entirely new and revolutionary approach to the granulation of fertilizer mixed goods.

Here's what the STAR will give you:

CONTROLLED GRAIN SIZE

New concept of grain size control. Larger percentage thru 6 on 16 mesh range, smaller portions of under and oversize.

HIGHER PRODUCT RECOVERY

Up to fifty percent increase in product recovery, because of its inherent, vigorous rolling — "not sliding" — action.

HIGHER PRODUCTION CAPACITY

More granulation the first time through, means substantially higher production capacity.

LOWER DRYING COST

Higher percentage of on-size in initial granulation means less fuel cost per ton due to lower hydration of total feed.



SACKETT STAR* GRANULATOR

This new machine has been called "The Missing Link" so badly needed in granulation. It performs the important job of forming a far greater portion of the initial feed into pellets of acceptable size. Select yours from a complete capacity range from 15 to 60 tons per hour.

Established Fertilizer producers are invited to get our up-to-the-minute counsel on their conversion and expansion programs. It is available without cost.

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From front office to finished goods

"International's Triple cuts our costs right down the line"

says Carl Sparks, Vice-President of Buhner Fertilizer Co.

In the front office of the Buhner Fertilizer plant at Danville, Ill., Carl Sparks keeps a close eye on delivery schedules and shipping costs. Out on the production line, Plant Superintendent Chuck Everhart carefully checks product quality.

With production costs on the way up, both agree the extra savings they get with International's Triple spruces up their profit picture. And with other Buhner plants at Seymour, Ind. (where general offices are located), and at Havana, Ill., these savings add up fast.

Big items in savings are International's dependable service and delivery. "Barge shipments up the Illinois River to Peoria mean substantial savings at all plants," says Sparks. "Even more important, we've learned we can rely on International's Triple to arrive on schedule."

In the plant, Everhart reports uniform high analysis and consistency of particle size mean savings in formulation costs . . . improved granulation.

You can realize similar savings by using International's Triple. Write or wire for full information on prices, shipping and warehousing arrangements.

Carl Sparks, vice-president and general manager, has been with the Buhner Fertilizer Co. for 22 years. Photo on desk is of F. F. Buhner, who founded the Seymour plant in 1889. As president, he maintains active leadership in the Buhner organization.



Technician Ken Ohmer watches product quality, tests soil samples in Buhner's chemical control laboratory.





International's Triple has the uniform particle size, "quick-wetting" characteristics important in granulation, report plant foreman George Hinkle, left, and Superintendent Chuck Everhart.

Pelleted and semi-granular fertilizers are sold under Buhner's Happy Farmer brand name in a 5-state sales area. Mixed goods are also shipped in bulk.



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JUNE, 1957

Chloro-IPC



COTTON: Hoeing costs \$1 now instead of \$10



ONIONS: Most stands don't even need hand hoeing



LEAFY VEGETABLES: Least weed germination in county



RICE: Significant yield gains noted in experimental plots

in for biggest season yet

Interim Report from Columbia-Southern shows continued expansion of crop uses for this highly effective pre-emergence herbicide

From time to time, Columbia-Southern Chemical Corporation brings you news of significant developments concerning the versatile herbicide Chloro-IPC. A complex organic compound, Isopropyl N (3-Chlorophenyl) Carbamate, this pre-emergence herbicide affords extremely effective weed and grass control for a constantly increasing number of crops.

First successfully introduced into large scale cotton cultivation in 1953, Chloro-IPC has since been widely applied to onions and many leafy vegetables. It is this season receiving extensive field testing in rice. Advanced research indicates effective applicability to Ornamentals and certain formerly sensitive crops.

Selective for annual weeds, Chloro-IPC gives outstanding pre-germination control of such undesirable plants as crab grass, pig weed, annual morning-glory, purslane, chickweed, smartweed, wild oats, and a number of broadleaved weeds indigenous to various growing areas.

APPLICATION

Good seedbed preparation is required for the successful use of Chloro-IPC or any other pre-emergence herbicide. All plant residues that would interfere with application should be destroyed before beds are set up. The seedbed should be firm, of uniform height and width, free of clods, and high enough to prevent washing of weed seeds into the treated area. Care should be taken in cultivating to avoid moving untreated soil into treated areas.

Formulated Chloro-IPC contains 4 pounds of active material to the gallon. Mixing readily with water, the formulation emulsifies without vigorous agitation. Chloro-IPC formulations will not clog spray nozzles.

Pre-emergence applications of Chloro-IPC should be applied to the seedbed at the time of planting or within a very few days after. Pre-emergence applications may be applied as band treatments to reduce costs. Post-emergence treatments are applied as directed sprays.

LENGTH OF EFFECTIVENESS

Chloro-IPC has shown long residual action, continuing to kill weeds and grasses in most soils for four or more weeks. Moderate rainfalls up to 15 inches per month do not leach the herbicide from the soil. If severe rainfall does wash soil after first application, it is generally safe to re-apply Chloro-IPC without fear of toxic build-up to replanted crop and crops planted the following year. This wide margin of safety distinguishes Chloro-IPC from most other pre-emergence herbicide formulations.

SAVINGS REALIZED

Greatest savings occur with crops that would otherwise require extensive hoeing. Cotton, onion, and spinach growers have reported savings of from \$5 to \$100 per acre as against previous hoeing costs. Fertilizer costs are lessened, too, as more of the plant food goes to crops rather than to weeds. With much hand labor eliminated, mechanization programs become far more economic.

LOOKING AHEAD

Partial test results concerning yield gains from rice following Chloro-IPC treatment will be published shortly. Research by Columbia-Southern and its licensees into granular forms of Chloro-IPC, suitable for improved weed control in tomatoes and other sensitive crops, may soon open new applications. Field legume and nursery stock experiences continue to produce reports highly favorable to this versatile herbicide.

Please direct your inquiries to any of the licensees below.

These manufacturers of Chloro-IPC formulations will supply detailed information

California Spray-Chemical Company Richmond, California	Jack Wilson Chemical Company Stockton, California
Chipman Chemical Company Bound Brook, New Jersey	Miller Chemical & Fertilizer Company Baltimore, Maryland
Cooperative Grange League Federation Exchange, Inc. Ithaca, New York	Niagara Chemical Division Food Machinery and Chemical Corp. Middleport, New York
Cotton States Chemical Company Monroe, Louisiana	Riverdale Chemical Company Harvey, Illinois
General Chemical Division Allied Chemical & Dye Corp. New York, New York	Stauffer Chemical Company New York, New York
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propionic acid	2-ethyl isohexyl alcohol
n-butyric acid	2-ethyl hexyl alcohol
isobutyric acid	isobutyronitrile
2-ethyl hexoic acid	manganese sulphate (Tecmangam)
ethyl alcohol	triethyl phosphate

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Tecmangam: Contains 75-78% manganese sulphate. Completely soluble and readily assimilated, Tecmangam is an ideal source of manganese for feeds. In manganese-deficient areas, Tecmangam can be added to fertilizer to supply this essential element.

For information, samples or specifications on any of the Eastman basic chemicals for use in herbicide, pesticide and feed production, write to any of the sales offices listed below.

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AGRICULTURAL CHEMICALS

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the fence about
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Progress **D** Chemistry

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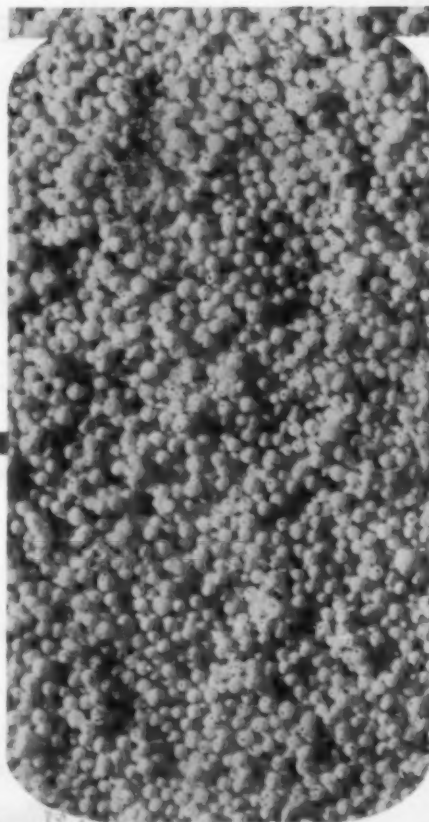


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45%

most
versatile
nitrogen
fertilizer



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memphis
tennessee

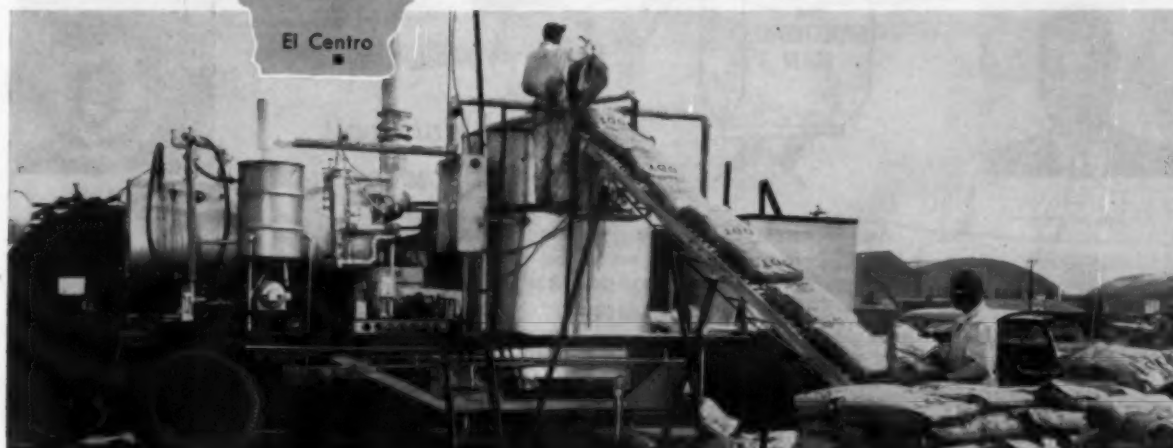


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United-Heckathorn chemical manufacturing and application facilities in key agricultural areas provide first complete local service

United-Heckathorn permanent or portable plants manufacture insecticides, fertilizers, weed killers, fungicides and fumigants on location and offer aerial or ground application service. The portable plants may be transported to your job site. Both types are scale versions of United-Heckathorn main Richmond, Calif., plant with its research, development and control laboratories . . . vast facilities for mixing, grinding, blending of dry materials and liquids for bulk sales, custom processing, private label packaging . . . engineering for construction and maintenance of specialized processing and application equipment. United-Heckathorn, Richmond or any of the affiliated plants are at your service and invite your call.

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Portable plant compounding chemicals for aerial spraying of beet leaf hopper on 250,000 acres of Kettleman Hills, Calif.



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Packaging and delivery for sales of agricultural chemicals for citrus crops, Corona, Calif.



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Formulation of dry & liquid insecticides for San Joaquin Valley. Lemoore plant near Fresno, center of cotton, potato & grape areas.

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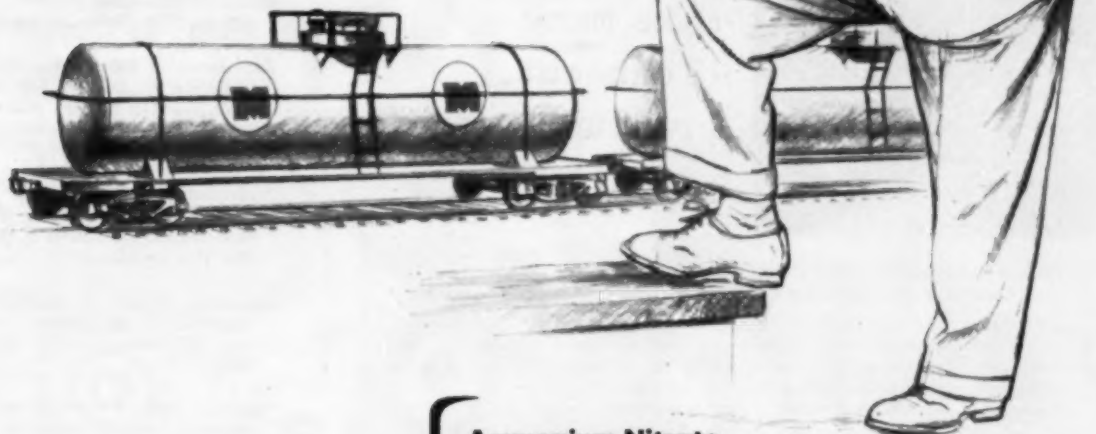


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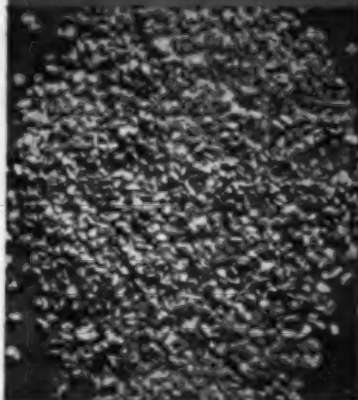
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National Agricultural Chemicals Association, Association Building, 1145 19th St., N.W., Washington, D. C. Lea Hitchner, executive secretary.

National Plant Food Institute, 1700 K St., N. W., Washington, D. C. Paul Truitt and Russell Coleman executive vice-presidents.

American Phytopathological Society, S. E. A. McCallan, secretary, Boyce Thompson Institute, Yonkers, N. Y.

American Chemical Society, 1155 16th St., N. W., Washington, D. C.

Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C., William Horwitz, secretary-treasurer.

Agricultural Ammonia Institute, Hotel Claridge, Room 305, Memphis, Tenn., Jack Criswell, executive vice president.

American Society of Agricultural Engineers, F. B. Lanham, secretary, 505 Pleasant St., St. Joseph, Mo.

Carolinas-Virginia Formulators Association, 516 S. Salisbury St., Raleigh, N. C. J. B. Maddrey, executive secretary.

California Fertilizer Association, Sidney Bierly, executive secretary, Suite 1, Boothe Building, 475 Huntington Drive, San Marino, California.

Chemical Specialty Manufacturers' Association, 110 East 42nd St., New York City, Dr. H. W. Hamilton, secretary.

Entomological Society of America, 1530 P. Street N. W., Washington, D. C., R. H. Nelson, secretary.

Mid-West Soil Improvement Committee, 121 West Wacker Drive, Chicago 1, Ill. Z. H. Beers, executive-secretary.

National Nitrogen Solutions Association, 2217 Tribune Tower, Chicago, Ill. M. F. Collie, secretary.

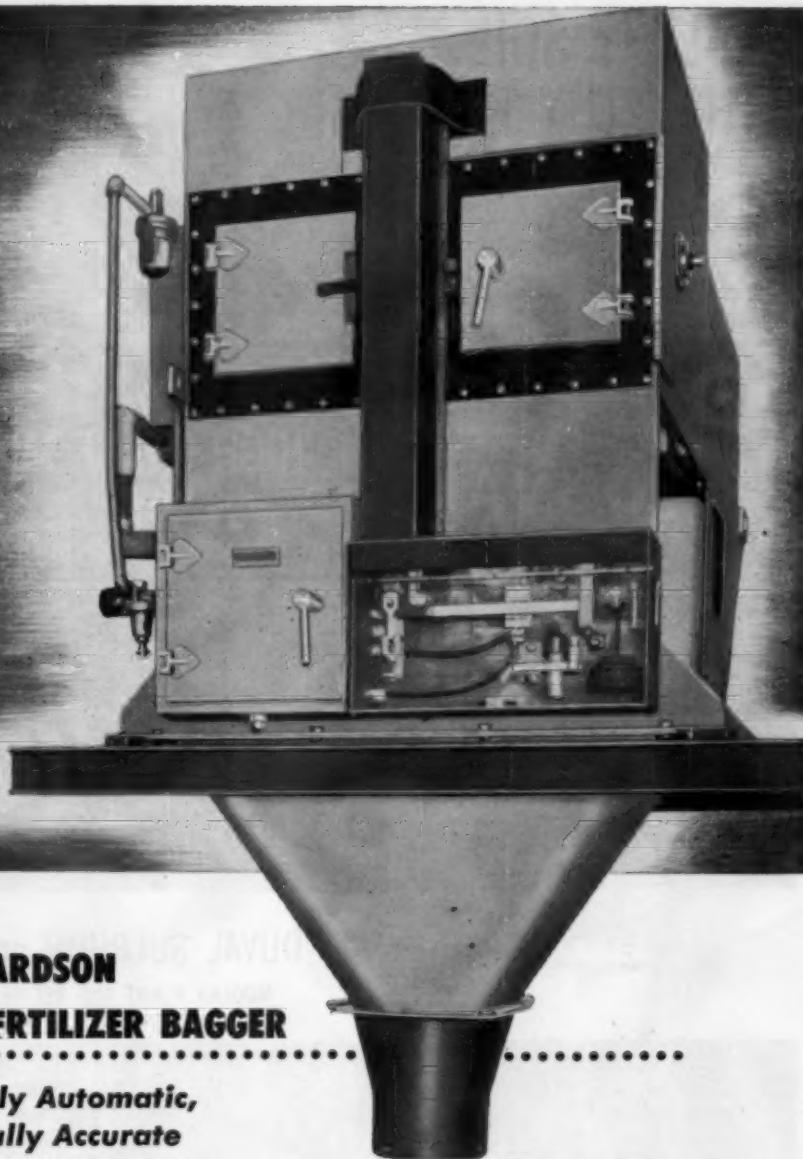
National Cotton Council, PO Box 3905, Memphis, Tenn.

Weed Society of America, W. C. Shaw, secretary, Field Crops Research Branch, Beltsville, Md.

Western Agricultural Chemicals Association, Charles Barnard, executive secretary, 2466 Kenwood Ave., San Jose, Calif.

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New RICHARDSON MODEL HA-39 FERTILIZER BAGGER

**Is Completely Automatic,
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Where it counts this new Richardson Model HA-39 Fertilizer Scale leads the field—on all counts!

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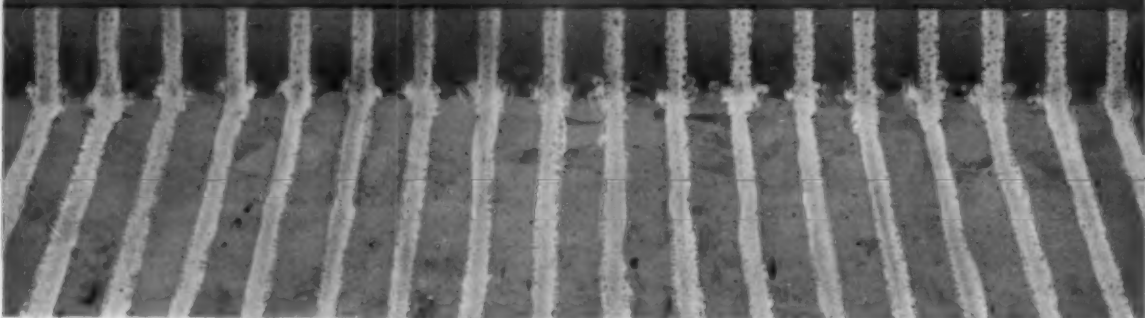
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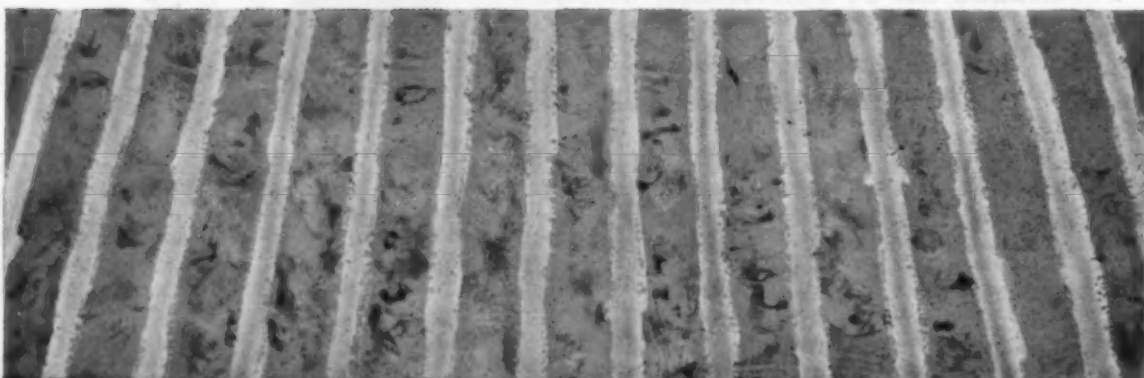
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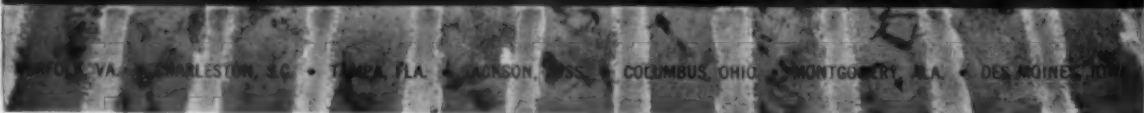


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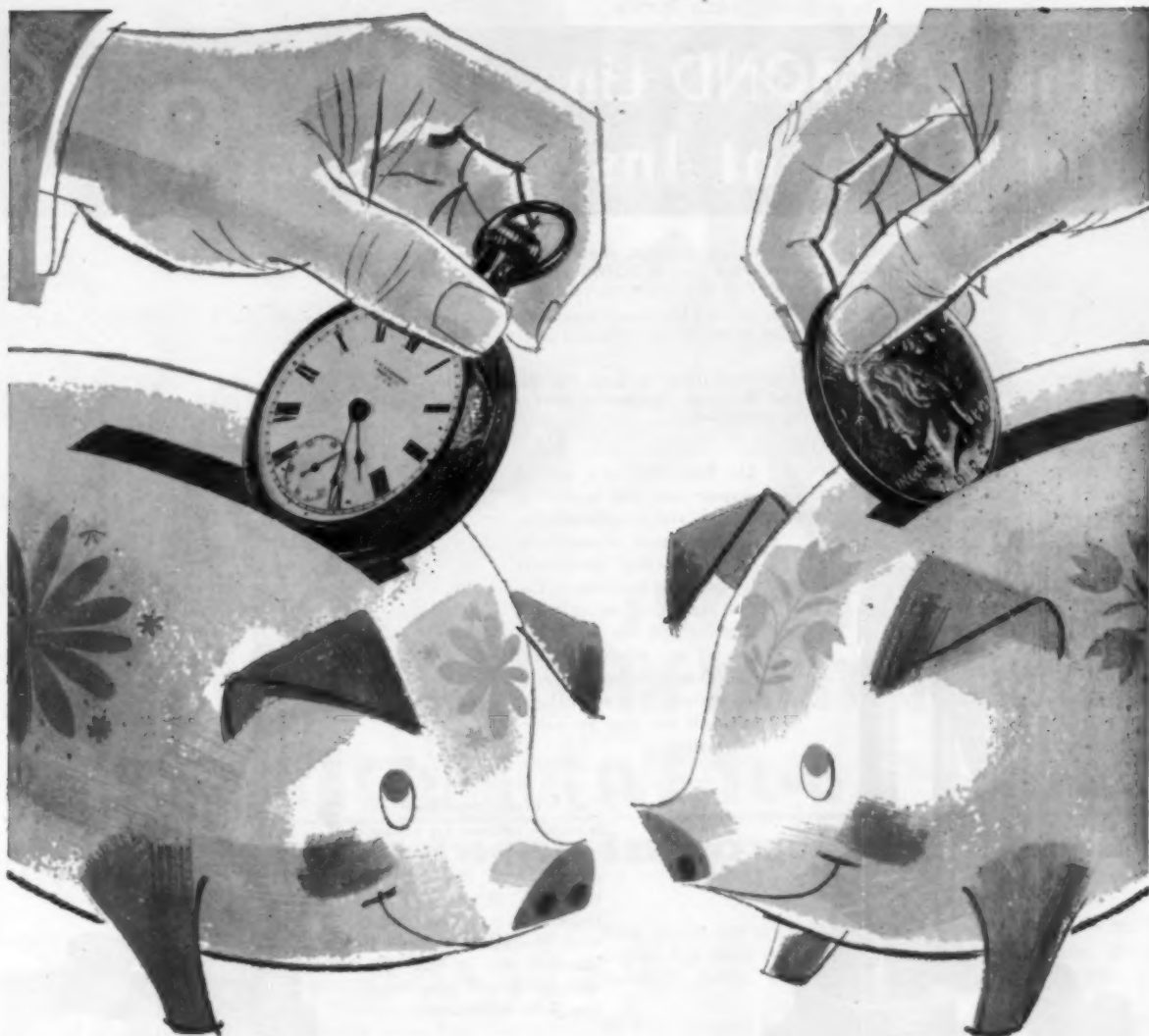
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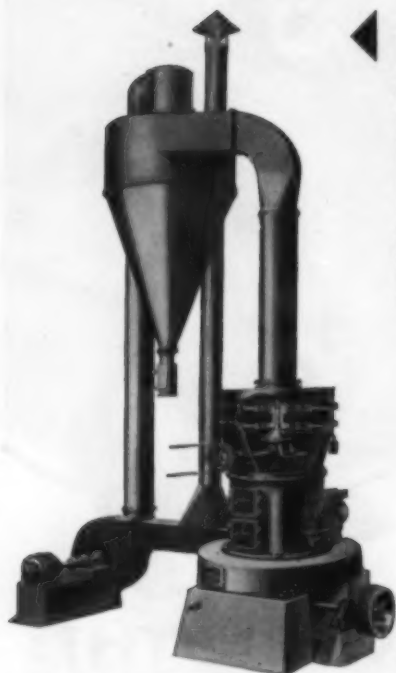
155 North Wacker Drive, Chicago 6, Illinois — Phone Financial 6-5900

The RAYMOND Line of Mills designed for Efficient Insecticide Grinding

RAYMOND Mills provide a clean, economical system for pulverizing, blending and classifying modern types of insecticide formulations with diluent materials for producing superfine and uniform mixtures.

Whizzer separation gives wide range fineness control by one simple adjustment and it also permits concentrate formulations to be handled in a single continuous process.

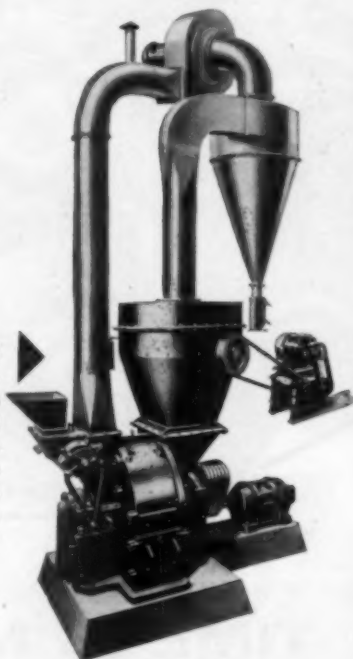
Raymond builds several sizes of both the Roller Mills and Imp Mills, so that you can select just the type equipment needed for your plant capacity and the kind of material produced.



RAYMOND Whizzer Type
ROLLER MILL

◀ The Roller Mill is a general purpose unit for producing all standard formulations including organic concentrates, sulphur bearing insecticides and similar products. The slow speed of the grinding elements and the large volume of air admitted to the mill system when handling concentrate formulations eliminate the need for external cooling.

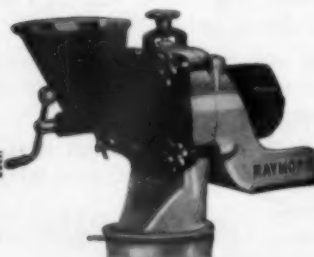
▶ The Whizzer type Imp Mill is highly efficient for producing field strength insecticides directly from the technical material. It handles the roughly mixed ingredients with previously pulverized diluents, and in one pass through the mill a uniformly fine, fluffy dust is obtained.



RAYMOND Whizzer Type
IMP MILL

RAYMOND "LAB" MILL

For running tests or for pilot plant work. Complete motored unit with screen separation.



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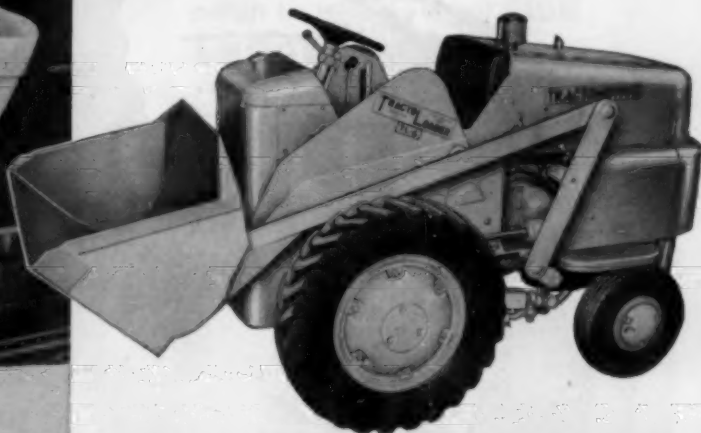
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BUCKET CAPACITY: $\frac{1}{2}$ cu yd
 BRAKE HP: 33.7
 SPEEDS: 2 forward; up to 10 mph
 2 reverse; up to 20 mph
 WEIGHT: 6,100 lb



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 IN TIGHT QUARTERS**

Compact **TRACTOMOTIVE TL-6** **TRACTO** Loader is a high producer in confined areas

Quickly unloads boxcars Users report it takes only two to three hours to completely unload a boxcar of bulk materials by using the TL-6 and a conveyor setup. Loading goes fast because there's a scooping action with tip-back bucket — and no ramming to get load. You ease bucket into pile and the hydraulic torque converter drive crowds in a heaping load — action is smooth, positive. No gear shifting either — operator just pulls or pushes a lever to go forward or reverse.



Travels through narrow aisles and doorways Compact design makes it easy to move material from one place to another in your plant . . . or to bring in material from outside stockpiles. Over-all length is only 9 ft, 7 in; width 4 ft, 5 in; height 5 ft, 4 in.



And loads are carried low, in a level position, with 50-degree tip-back of bucket — means less spillage, greater stability, better visibility and easier maneuvering.

Makes hairpin turns around columns and posts TL-6 keeps travel time down because it makes right-angle turns around columns and posts. No lost time maneuvering around, either — there is a short, $6\frac{1}{2}$ -ft turning radius. And the operator's job is made easier with Power Steering — now standard equipment!



Ask your Allis-Chalmers construction machinery dealer to show you how you can save time and money on close-quarter material handling with the TL-6 Tracto-Loader. See for yourself why

TRACTO is a sure sign of modern design

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 The Complete Line Of Tracto-Loaders

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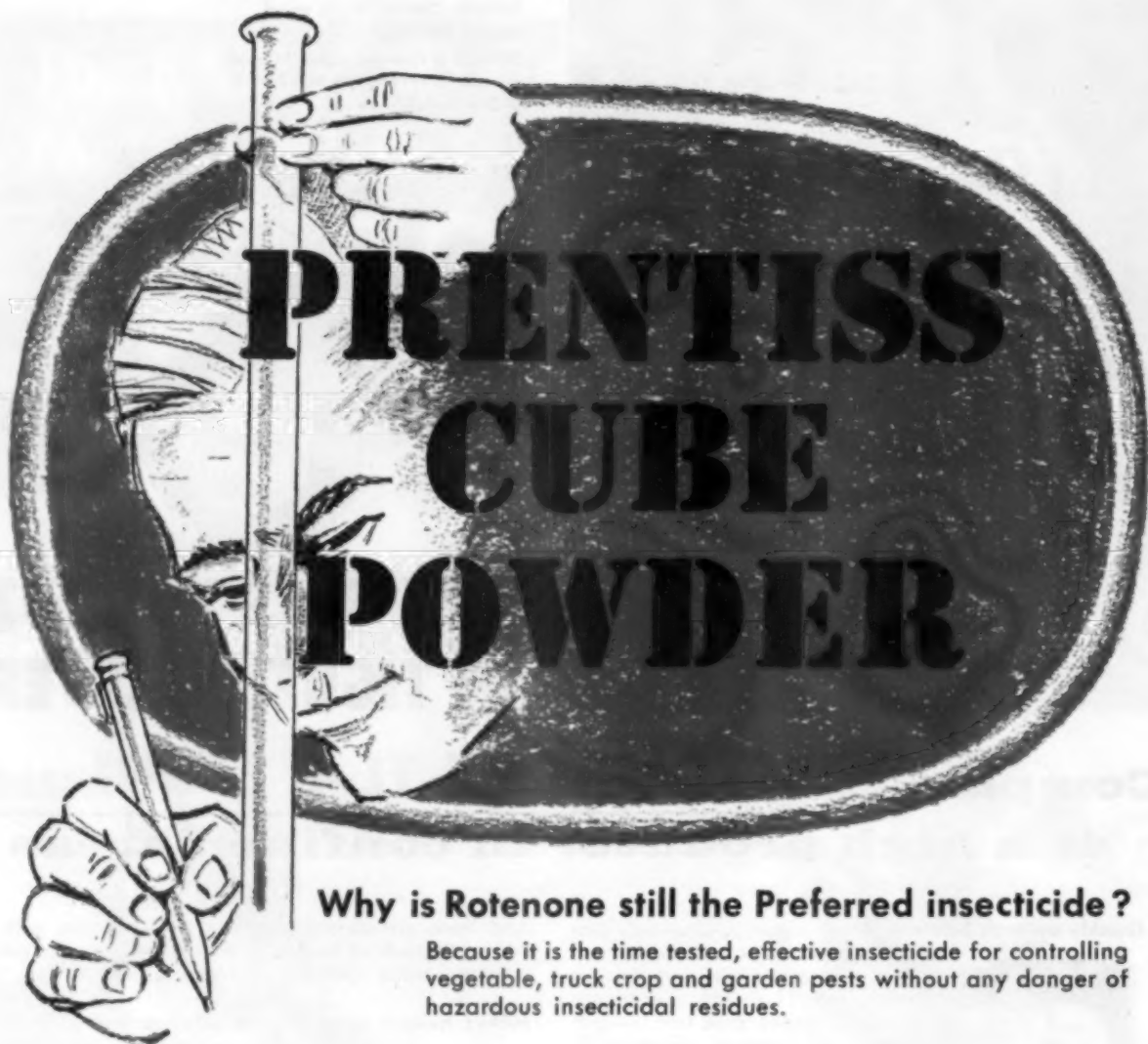
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TRACTOMOTIVE CORPORATION, Dept. A
 Deerfield, Illinois

- ☐ Please arrange a demonstration of the TL-6
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 Company
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Why is Rotenone still the Preferred insecticide?

Because it is the time tested, effective insecticide for controlling vegetable, truck crop and garden pests without any danger of hazardous insecticidal residues.

Why is Prentiss Rotenone Powder the preferred brand?

Because Prentox Cube is the bonus product. Every 5,000 pounds is batch blended and analyzed for Rotenone content to guarantee the insecticide manufacturers a genuinely standardized Rotenone Powder.

Use Prentox Cube Powder for your quality insecticide formulations and greater profits to you.

OTHER PRENTISS PEST-TESTED PRODUCTS ARE:

Rax Powder (5% Warfarin)
for control of rodents
Pyrethrum
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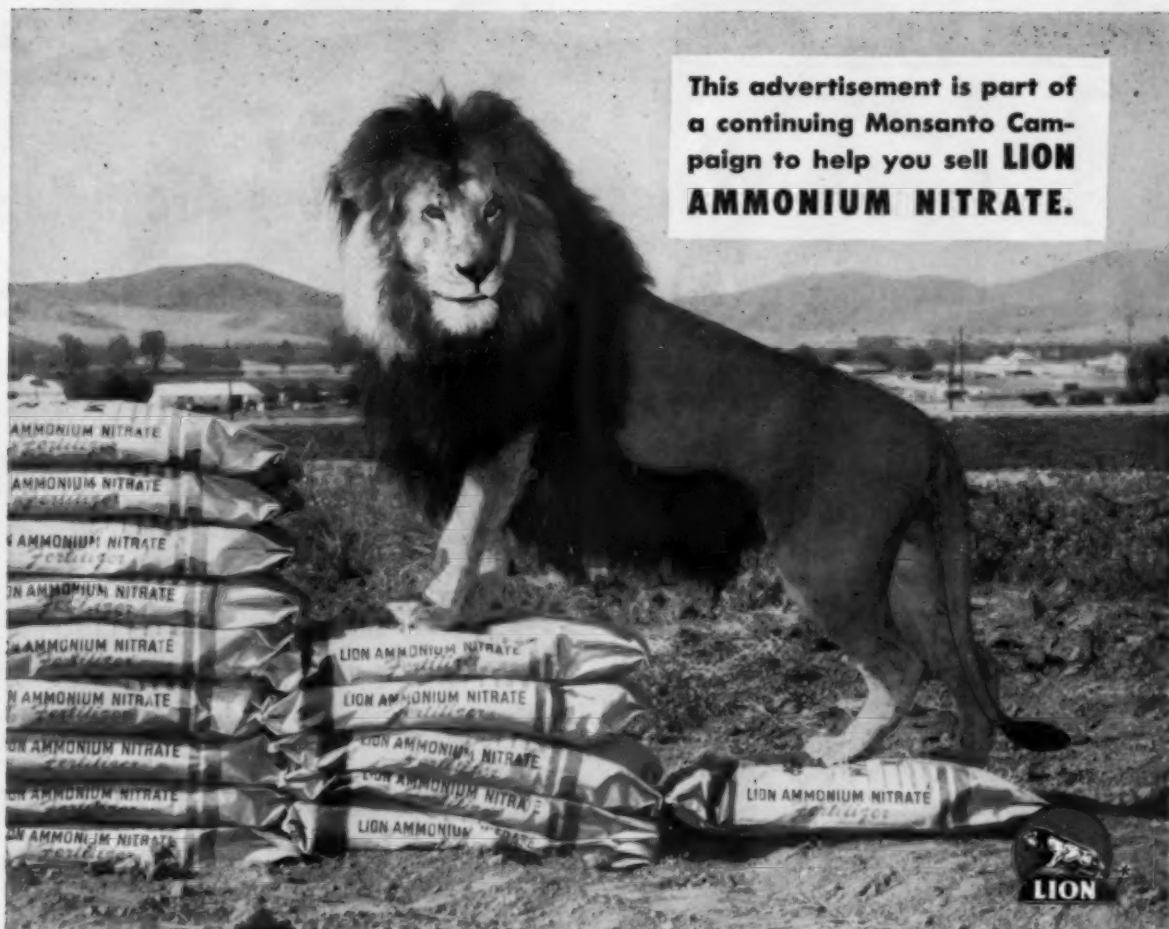
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This advertisement is part of
a continuing Monsanto Cam-
paign to help you sell **LION**
AMMONIUM NITRATE.

*Trade-mark of Monsanto Chemical Company

You get bigger yields with LION in your fields

LION BRAND AMMONIUM NITRATE IS GUARANTEED TO FLOW FREELY

FOR MORE PRODUCTION, Lion Ammonium Nitrate contains TWO kinds of plant nitrogen. *Quick-acting* nitrate nitrogen that gets crops started fast... and *long-lasting* ammonia nitrogen that resists leaching and feeds your crops steadily during the important growing months that follow.

FOR EASIER SPREADING, Lion Ammonium Nitrate is in pellet form. These pellets are specially coated to withstand caking... then packed in specially lined, moisture-resistant bags. Result: LION brand is *guaranteed* to flow freely—not for just a year, but until used—when you follow storage directions on the bag.

3 EASY STEPS TO GET ALL THE FEEDING-POWER YOUR CROPS NEED

1. TEST YOUR SOIL to see what kinds and amounts of fertilizers are needed. Your local farm authorities will help.

2. ORDER WHAT YOU NEED of mixed fertilizer and Lion brand Ammonium Nitrate from your fertilizer dealer. When you buy LION, you get top-quality, low-cost nitrogen fertilizer *guaranteed* to flow freely; *guaranteed* to contain 33.5% nitrogen.

3. APPLY THE FULL AMOUNT of mixed fertilizer and Lion brand Ammonium Nitrate soil tests indicate. Don't skimp—fertilizer is the least expensive item you use for crop production.

GROW MORE PROFITABLY...
Weed Killers • Brush Killers • Parathion Insecticides • Meta-Green® to keep silage fresh • Phosphates (liquid and solid) • LION Sulphate of Ammonia • Anhydrous Ammonia

MONSANTO CHEMICAL COMPANY • Inorganic Chemicals Division, St. Louis 1, Mo.



Improved Processing Techniques Are Being Developed By Spencer Chemical Company:

Fertilizer manufacturers will benefit from new pilot fertilizer-mixing plant now at work

WOULD you like to be able to produce higher analysis mixed fertilizer with low-cost raw materials . . . lower your production costs . . . improve physical properties and mechanical condition of your mixed fertilizer?

To help fertilizer manufacturers do these things, and many more, Spencer Chemical Company of Kansas City, Missouri, producer of SPENSOL Ammoniating solutions, has constructed a pilot fertilizer mixing plant at the company's Jayhawk Works near Pittsburg, Kansas.

Another Spencer First

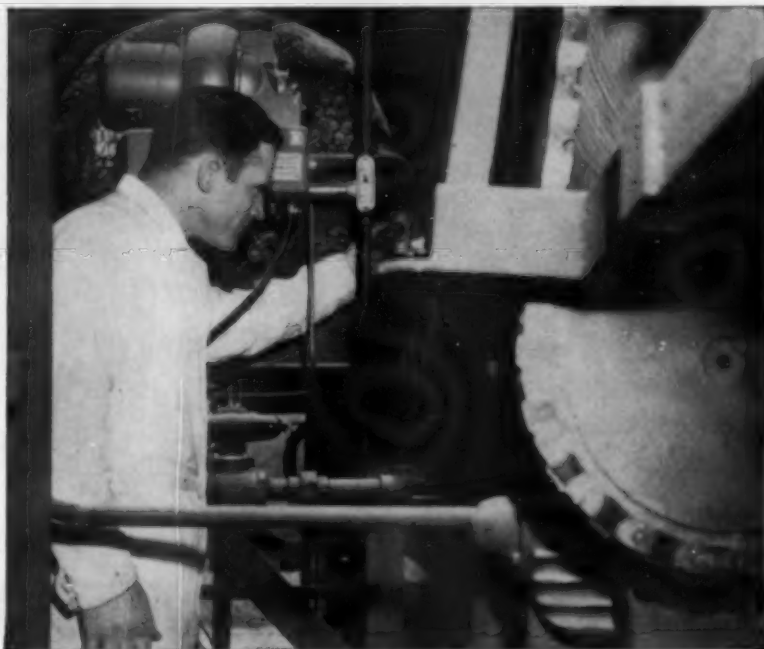
Since Spencer does not produce mixed fertilizer, the plant will be used solely for research work to develop improved mixed fertilizer processes.

Spencer is the first basic raw materials supplier to offer this service to fertilizer manufacturers.

Long a producer of Nitrogen materials for the fertilizer industry, Spencer Chemical Company has a major interest in the future of the industry, and wants to help manufacturers find ways to produce the best possible product in the most efficient way.

The results of all research will be made available to fertilizer manufacturers through demonstrations and printed reports.

The information will be supplied free of charge by Spencer's Agricul-



Part of the equipment in the new Spencer pilot plant, which can use any commercially available raw materials and produce any analysis that is chemically feasible. (See story at left.)

tural Chemical Technical Service Department.

Whether or not you, as a fertilizer manufacturer, use SPENSOL in producing mixed fertilizer, you can

receive reports on the results of tests as they are performed by writing:

Spencer Chemical Company, Agricultural Technical Service, Dwight Bldg., Kansas City 5, Missouri.



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If you had to drive a car for 8 solid hours in traffic like this . . .
would you be satisfied with an old fashioned gear shift?

Even an antique car enthusiast will have to admit that a manual gearshift is a tiresome business when you're caught in a traffic jam—when you have the constant clutching, and declutching and inching along in bumper-to-bumper traffic.

Did you ever recognize the similarity between a traffic jam and a typical bulk-handling job? In both cases, the runs are relatively short, constantly Stop and Go (and in bulk handling, constantly Forward and Backward). The automobile manufacturers long ago took this burden off the driver by giving him various types of "clutchless" transmissions. Now Clark has done the same thing for the industrial Tractor

Shovel operator: Clark's exclusive Power-Shift transmission on the 16 cu. ft. MICHIGAN Model 12B.

No clutch pedal, no engine clutch

The small photo at left shows the operator's compartment of the MICHIGAN Model 12B. There's a double brake pedal—operate it with either foot. There's no clutch pedal, no engine clutch, no gear clash when shifting. This heavy-duty Clark transmission is as fast and as easy to operate as a modern car—the driver merely selects High-Low-Forward or Reverse and lets the Power-Shift transmission do the work. He can make any shift while moving in either direction.

Improves operator efficiency

Power-shifting drastically reduces operator fatigue. The MICHIGAN operator doesn't have to ride a clutch all day. He can work smoothly and easily through peak periods throughout the day and still be close to top efficien-

cy when bulk-handling runs overtime. New operators can learn to run the MICHIGAN Model 12B in a few hours. And when several operators take turns on the MICHIGAN, the machine doesn't suffer—the hydraulic-operated Power-Shift transmission provides built-in protection against "clutch riders" and "cowboys."

See for yourself

Without any obligation, you can put the MICHIGAN Model 12B to work on any job in your own plant. We'll bet the MICHIGAN will outproduce any loaders in its size range, bar none. You be the judge. Clip the signature below to your letterhead and mail to us—we'll make the arrangements for an on-the-job demonstration.

Michigan is a registered trade-mark of

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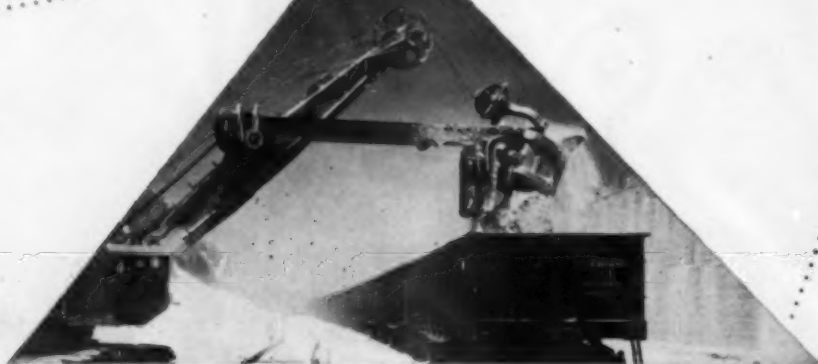
Michigan

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helps to create headline products



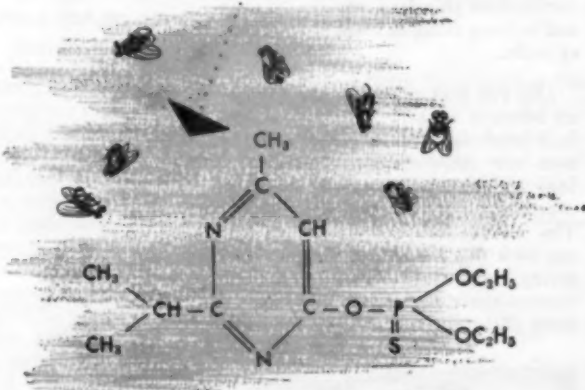
DIAZINON*

What a 'killer' this complex chemical is turning out to be! And quite impartial as to its victims: — houseflies, barnflies, fruitflies, aphids, mites, ants, beetles, chinch bugs, roaches, and many other pests that bother man and beast. It kills them dead!

As with the former chemicals which made such notable headway in man's fight to subdue these destructive pests, Sulphur is very much in the picture—here is one of the many variations of the benzene ring... the Diazinon Formula. That letter "S" tied in with the letter "P" discloses the all-important thiophosphate.

Sulphur, often called one of the Four Pillars of the Processing Industry, is benefiting mankind in many ways. None is more important than that of controlling crop-destroying pests.

*A product of the Geigy Chemical Corporation.



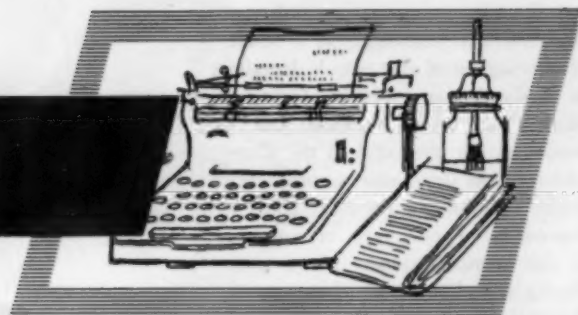
Texas Gulf Sulphur Co.

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Sulphur Producing Units

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- Spindletop, Texas
- Worland, Wyoming

EDITORIALS



WE have heard of a fair number of people getting out of the agricultural insecticide business over the past few years, and perhaps the industry will be a bit healthier when more of those who rushed into the field back seven or eight years ago make the same decision,—that they don't belong in the pesticide business. Almost without exception the motivating factor of those who have made this decision has been their inability to make a profit selling insecticides.

Now comes the report of a concern that is giving up the insecticide business (although continuing to handle a group of associated agricultural chemical products) because they have decided that there is something basically wrong with today's broad spectrum pesticides. The development of resistance, the need for more complex spray schedules, the hazards involved in some of the more powerful toxicants, have all combined to persuade this particular concern that today's insecticide industry is working on a basically wrong premise.

While we share their concern over some of the serious problems that face the manufacturer and applicator of insecticides today, we disagree completely with their conclusion. Resistance we have always had. The use of all toxicants is accompanied by some degree of hazard. As one pesticide loses its effectiveness, or as a superior product is developed, there have always been changes called for in spray schedules. But, may we remind our friends who are preparing to throw in the sponge, that insects don't ever give up,—not even when a new and superpowerful pesticide is developed that mows them down.

And the alternative to control of insect pests is nothing less than destruction by them.

Though the problem of effective pest control is a big one, and a continuing challenge, we believe there is every reason for optimism. The industry is still developing new and more effective materials for its arsenal to replace pesticides that may have been good enough ten years ago but are no longer effective today. Elsewhere in this issue we report several promising new developments. They may help to convince even those, who perhaps share this feeling of concern, that our entomological and chemical research brains are adequate for the task of providing continuing adequate, safe and effective protection.

THE outlook for fertilizer sales during the current season has been clouded somewhat by the action of Congress in moving to end the soil bank program. Earlier it had been anticipated that increased sales in the mid-west and other sections of the country might well more than offset the reduced tonnage of fertilizer which may be applied on cotton and tobacco this year.

However, with the future of the soil bank in doubt, fertilizer sales could be affected adversely, for the best potential fertilizer customer is of course the farmer with money in his pocket. It remains to be seen, to be sure, whether the action of the House in killing the key acreage reserve parts of the soil bank will be reversed by the Senate. This latest action may eventually prove to be nothing more than a political maneuver.

(Continued on Page 132)

AMERICAN fertilizer manufacturers will be soon assured of an alternate source of potash on the American continent, as a result of opening up of vast potash deposits in Saskatchewan, western Canada. Most of the major American potash producers are interested in the Canadian potash development, and practically every major producer holds a concession of one type or another in this tremendous new potash producing area; but Potash Company of America is much further advanced than the rest of the industry with its plans, and as a matter of fact will probably be ready to start shipping before the end of 1958 from a new plant being constructed near Saskatoon.

Up to the present, American potash supplies have come primarily from the Carlsbad area of New Mexico, with smaller amounts from the American Potash properties at Trona, Calif. Until approximately twenty-five years ago, American potash users had always been dependent on imports (primarily from Germany), but beginning in 1930 domestic potash supplies began to be tapped. U. S. Potash Corp. started operations in the Carlsbad area in 1930, with ship-

May 14 . . Chicago . . International Minerals & Chemical Corp. will start immediately sinking a shaft for a new potash mine in the Canadian province of Saskatchewan. Contract for construction of the mine shaft and several surface structures has been let to Utah Construction Co. of San Francisco. Work will be rushed to complete the buildings before the end of the summer.

Louis Ware, president of IMC, said the company's potash mine at Carlsbad, N. M., has been operating at capacity. The new Canadian project will take care of expanding business. Mr. Ware observed that the Canadian area contains ample reserves for a mine "that will produce at more than twice the rate of our Carlsbad mine."

ments commencing in 1933. Potash Company of America started production in Carlsbad in 1935, and now a total of six companies mine potash in this area; the other four being International Minerals & Chemical Corp., Duval Sulphur & Potash Co., Southwest Potash Corp., and most recently National Potash Co. These companies contribute about 92% of domestic production.

The Carlsbad potash deposit, and the Canadian deposit now being worked for the first time, constitute the only two known deposits of potash on the North American continent. The Canadian deposits occur in a belt perhaps some three hundred miles wide, and extending over more than three million acres of Crown and other land running diagonally across the western Canadian province of Saskatchewan.

While the deposit in Saskatchewan, Canada is a high grade ore, it lies much further below the surface (3,000 feet) than does the Carlsbad potash (1,000 feet), and there are other difficulties to complicate the

mining operation which include the rugged Canadian winter climate, and the fact that the rock strata overlying the Saskatchewan deposits consist of a long series of water-bearing sedimentary rocks. Special techniques are required to put down and maintain the shaft, and to guard against water in the surrounding rock causing wash-outs, cave ins, seeping into the shaft, etc.

The method Potash Company of America engineers followed was to freeze the ground surrounding the selected shaft site by putting down a ring of freeze holes. These combine to form a cylinder of ice, inside which the shaft is sunk and a concrete lining installed. Even the concrete, incidentally, presented a problem for here was a considerable investment in time and money before exactly the right concrete was discovered to meet the particular demands of the installation. As a matter of fact, Potash Company have done a great deal of pioneering work in the area from which other potash producers as well as potash users will inevitably profit, the major contribution being the demonstration, at the cost of over five million dollars so far, that potash mining in this

POTASH



General view of shaft site at Saskatoon, showing totally enclosed head frame of mine.
Potash Co. of America

... development of deposits in Canada opens alternate source

distant and difficult Canadian area may be a practical proposition.

With its shaft completed—the first in the area—Potash Company is now starting construction of a processing plant which should be completed early in '58. Deliveries of potash from the Canadian source will begin, it is anticipated, before the end of '58. Cost of the entire operation is reported to be well over \$20,000,000.

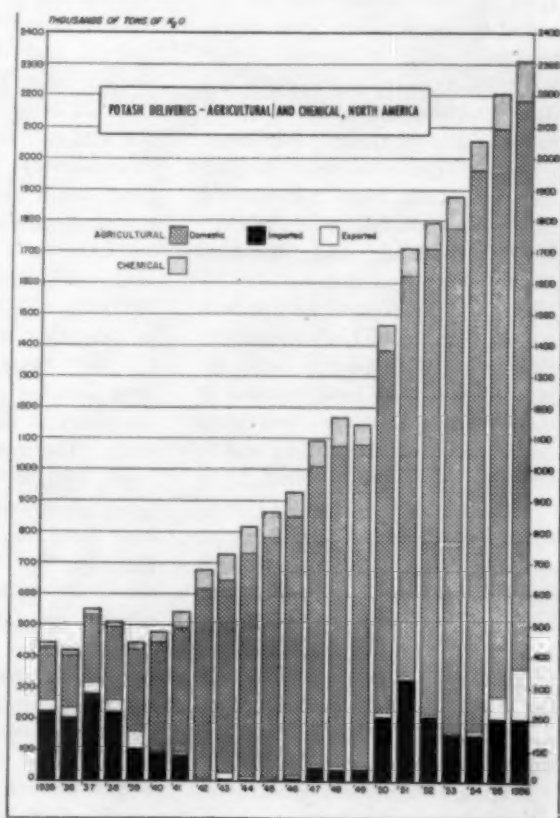
What will this new source for potash on the American continent mean to American and Canadian fertilizer manufacturers who use 90% of current domestic production of 2,200,000 tons (in terms of K_2O) of potash annually? For one thing it will certainly make the U. S. independent of the rest of the world for this essential chemical raw material for years to come. Furthermore, it will provide a second nearby source, lessening dependence on the Carlsbad area, and assuring potash users of an alternate source of supply should deliveries from Carlsbad be interfered with by possible major breakdowns in any of the Carlsbad mines, labor difficulties, interruption in rail transit from New Mexico, washouts, etc.

Potash users remember too well the lengthy shut down in the Carlsbad area in 1949 and 1950. A strike of potash workers resulted in a com-

plete shut-down for three major potash producers which lasted for 73 days. With the strike coming as it did just a few months in advance of the '50 growing season, it resulted in serious impairment of fertilizer supplies, and made it necessary to resort

to imports of European potash to prevent serious dislocations in supply at a high cost to the fertilizer industry. The imports jumped to 200,000 tons of K_2O in 1951, and to over 300,000 tons the following year to (Continued on Page 119)

Twenty years ago, American supplies of potash came about $\frac{1}{2}$ from U.S. sources, and $\frac{1}{2}$ from imports. Domestic production at that time was less than 200,000 tons of K_2O a year. Production in the current year is estimated at about 2,200,000 tons K_2O ... eleven times the volume of potash imports.



SYSTEMIC CATTLE GRUB CONTROL

Brown ticks in the ear of a heifer. Mazabuka, Northern Rhodesia.



FOR the last ten years, entomologists in the U. S. Department of Agriculture have been seeking systemic insecticides for the control of cattle grubs (*Hypoderma lineatum* (De Vill.) and *bovis* (Deg.)). Insecticides may be absorbed by cattle when given subcutaneously, orally, or dermally. Systemic effects were noted when lindane, dieldrin, and aldrin were injected subcutaneously (McGregor et. al. 1955) or when some phosphorus compounds were administered either subcutaneously or orally (McGregor, Radeleff, and Bushland 1954). Roth and Johnson (1955) found dieldrin effective against both species when injected subcutaneously. Graham (1949) sprayed cattle repeatedly with high concentrations of chlorinated hydrocarbon insecticides during and after the heel fly season, but noted no systemic effects.

Smith and Richards (1954) found that three phosphorus insecticides were toxic to second- and third-instar larvae when scrubbed on the backs of infested cattle. Bayer 21/199, *O*-(3-chloro-4-methylumbelliferone) *O,O*-diethyl phosphorothioate, showed particular promise. Roth and Eddy (1955) confirmed these results and also found this insecticide to be effective as a spray. This report describes experiments con-

ducted at Kerrville, Tex., in 1955 and 1956, which show that when applied externally, Bayer 21/199 destroys young grubs in the body of the host before they break through the skin.

Radeleff and Woodard, Department of Agriculture veterinarians at Kerrville, had found that grown cattle and calves more than 2 months old could be safely sprayed to saturation with 0.75-per cent Bayer 21/199 (unpublished). Because Dow ET-57 given orally to cattle had shown special promise in recent tests (Roth and Eddy 1957, McGregor and Bushland 1957, Radeleff and Woodard 1957), it was also tried as a spray in comparison with 21/199.

1955 TESTS.—The tests in 1955 were designed primarily to measure the effects of the sprays on encysted grubs. Therefore, cattle already infested with second- and third-instar larvae of *lineatum* were purchased at local auctions. In the vicinity of Kerrville, these stages first appear in the backs of cattle during the late summer and fall in contrast to the winter in most parts of the United States. Therefore, animals for these experiments were bought from August to November. The cattle were yearlings, and were either Jerseys or crosses between Jerseys and beef breeds. Nothing was known about

the history of exposure to grub infestation, but as the cattle were of local origin and visibly infested when purchased, the treatment groups were considered fairly comparable.

Bayer 21/199 was tested in an emulsion prepared from a concentrate made in the laboratory by dissolving 25 parts of the technical material in 65 parts of xylene and adding 10 parts of Triton X-100. This concentrate was diluted with well water for spraying.

The first spraying was done on August 31, when a 0.75 per cent emulsion was applied at 250 pounds pressure on ten yearlings at the rate of 2 quarts per animal. The treatment caused 95 per cent mortality of the 146 grubs present, so a follow-up test was made.

On October 5, ten cattle were treated with a 0.25-per cent emulsion, and the mortality of 155 grubs was 94 per cent. In subsequent examinations, new grubs were observed to encyst and grow normally in the cattle treated with the 0.25-per cent, but none appeared in the backs of those treated with the 0.75-per cent spray.

A third group of ten animals was sprayed on November 14 with a 0.5-per cent emulsion, and the mortality of the 163 grubs was found to be 96 per cent. No new grubs

appeared, but starting at that time grub populations diminished very rapidly, as indicated by examinations of cattle at two local auctions. Therefore, no significance can be attached to the lack of new grubs in this group.

No new grubs encysted in the cattle treated with the 0.75-per cent emulsion after the first mortality records were taken, but 25 new grubs appeared in similar animals treated later with 0.25-per cent—5 in three, 4 in one, and 3 in two animals.

1956 TESTS.—The 1955 tests had suggested that Bayer 21/199 functioned as a systemic insecticide

Since there were not enough calves in the Camp Stanley herd to test all formulations at a range of dosages, it was necessary to select a single concentration for each formulation. As the 1955 work had shown promise for 0.75-per cent 21/199 applied at 2 quarts per animal to cattle weighing from 400 to 600 pounds, that concentration was selected for the 1956 spraying. The test calves were estimated to weigh around 400 pounds each, or roughly 200 kg. Each calf was sprayed over the entire body with 2 liters for an average dermal treatment of 75 mg./kg. As Dow ET-57 had been found effective as

a cattle grub systemic when given orally at 100 mg./kg., the same dosage was selected for the dermal application. This dosage was attained by spraying each calf with 2 liters of 1-per cent ET-57.

The calves were sprayed in groups of seven in a small pen. A power sprayer was used at about 100 pounds' pressure, and the operator stood within a few feet of the calves. Since the animals were in summer coat, they became wet before all the insecticide was expended; so spraying was interrupted for about 15 minutes to let the hair dry in the sun. Since they were treated in groups, doubtless some individuals were treated more heavily than others, but every effort was made to treat as uniformly as was feasible. The actual dosage of 21/199 undoubtedly exceeded that given in 1955, when larger cattle were sprayed with 2 quarts of insecticide and there was a greater loss from runoff.

All cattle were treated on July 25, and thereafter examinations were made every 4 weeks. In the first

(Continued on Page 123)

with Bayer 21/199 Sprays

By H. M. Brundrett, W. S. McGregor, and R. C. Bushland

Entomology Research Division
Agr. Res. Serv., U. S. D. A.

against cattle grubs. In 1956, the tests were continued with larger numbers of animals, so that more reliable conclusions could be drawn. In order to have the most valid comparisons possible, some cattle from the government herd were treated. These animals were Hereford calves approximately 8 months old that had been born in the same pasture at Camp Stanley, Tex., and had been pastured together from birth. They had therefore been similarly exposed to natural infestation. These cattle were divided into test groups and treated in July, about a month in advance of the grub season. Bayer 21/199 and Dow ET-57 were compared in two formulations—laboratory-prepared 25-per cent emulsifiable concentrates and commercial wettable powders, 50 per cent for 21/199 and 25 per cent for ET-57. The 21/199 emulsifiable concentrate was the same formulation used in 1955. These insecticides were diluted with tap water from the Army water system at Camp Stanley.

* Resigned July 13, 1956.

TABLE 1.
Maximum number of grubs found at any monthly examination from August to February among cattle sprayed in July

Treatment	Number of Calves	Number of Grubs									
Bayer 21/199, 0.75%											
Emulsion	7	0	0	0	0	0	0	0	0	1	
Suspension	7	0	0	0	0	1	1	1	3		
Dow ET-57, 1.0%											
Emulsion	7	15	17	26	29	33	37	42			
Suspension	7	10	16	19	30	32	33	37			
None (Controls)	11	20	22	23	26	29	38	39	41	55	56, 60

TABLE 2.
Average number of grubs per calf found at each monthly examination from July, 1956, to February, 1957, in the herd sprayed with experimental insecticides

Treatment	Number of Animals	July 25	Aug. 22	Aug. 31	Sept. 19	Oct. 17	Nov. 14	Dec. 12	Jan. 9	Feb. 6
Bayer 21/199, 0.75%										
Emulsion	7	0	0	0	0	0.1	0.1	0	0	0
Suspension	7	0	0	0.1	0	0.3	0.4	0.3	0.3	0
Dow ET-57, 1.0%										
Emulsion	7	0	1.7	3.4	10.3	16.9	21.3	19.9	6.9	0.1
Suspension	7	0	0.9	2.3	8.1	12.7	17.4	17.7	7.7	0.6
None	11	0	3.0	4.2	14.3	25.1	29.4	21.6	7.6	0.5

1 Raw material is delivered to screens by an inclined belt conveyor.

2 Main operating floor with access from control room to granulator, etc.

3 Stacking the processing components provides complete gravity flow.

From plant construction to

CAN you build a new fertilizer plant and get it ready for production within six months? This was the question management of Land O'Lakes Creameries put to engineer-contractor firms before awarding a contract for its new plant at Minneapolis, Minn.

The officials were interested in new facilities and wanted to know if it was possible to have them available for the coming season. Manufacturing fertilizer is of course seasonal and even one month's delay in completing a plant could put the company behind the eight ball for that season, and saddle it with an idle investment for a full year. Once the

spring planting season is missed, the market demand for fertilizer falls substantially until the following year.

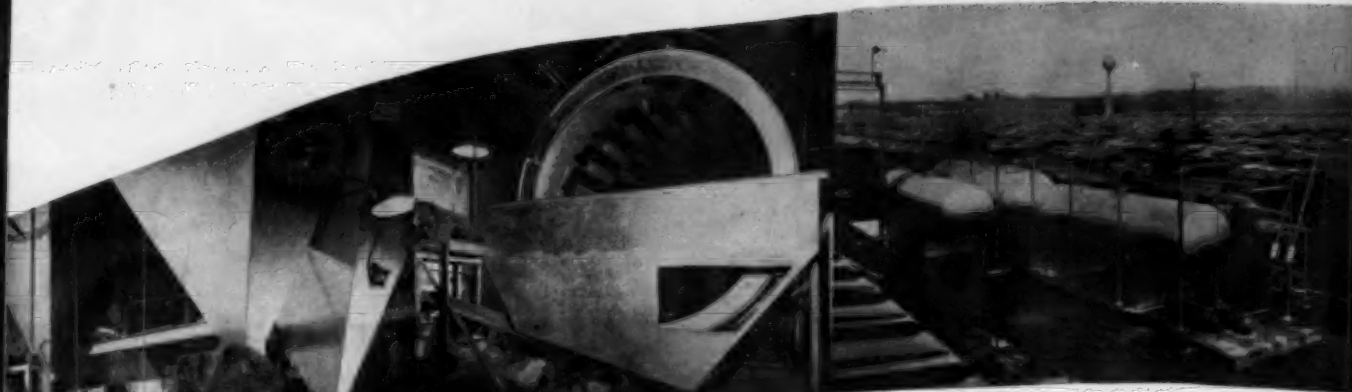
The subject of a new plant came up in the spring of 1955. Market research and analysis of sales pointed out the advisability of the company marketing a granular type of fertilizer, and having it ready for the next season. Requirements for the production facilities were quickly firmed, conferences were held with engineering firms and by June the work was authorized.

Although experience of several producers indicated the time limit could not be met, the contract was accepted by Blaw-Knox Company, Chemical Plants Division, in July without qualifications. Long experience in meeting similar demands by

the chemical industry enabled the Division to set up a fast engineering and construction schedule to meet the deadline set by the customer.

According to C. A. Johnson, manager of the Feed, Seed & Fertilizer Divisions of Land O'Lakes, the new plant was finished on time and met all performance expectations and production demands the first season. Phil Stocker, manager of the Fertilizer Division, reports that reception of the new granular product by farmers was enthusiastic.

The schedule of work to be done by Blaw-Knox consisted of complete engineering and installation of tank-car unloading and liquid-storage facilities, processing equipment, building-steel work, dust collectors, painting, etc. Engineering was under way in August and ground was first broken in September. From then on it was a race against the weather, and



From this cooler, the product goes to storage and bagging station.

Liquid storage tanks on grounds of the Land O' Lakes Minneapolis plant.

Inclined belt conveyors distribute raw material from the surge bins.

Fertilizer production - in 6 months

equipment was placed as the building steel went up.

Another exceptionally interesting feature of the plant is the installation of a complete dust collector system. Fertilizer plants are usually heavy dust producers and are not welcomed in built up areas, but the Land O'Lakes plant is the exception. Its neighbor, Minneapolis-Honeywell Regulator Co., and the city air pollution control officials are pleased with the virtual elimination of dust, not only from the new plant, but also from previously existing facilities. Because of the nearby plants and a 3,000 car parking lot only 100 feet away, adequate dust collection was extremely important.

The process adopted for Land O'Lakes' new plant is the TVA continuous ammoniation and granulation system. It includes the continuous weighing of solid raw material storage and automatic metering of

liquids, ammoniation, granulation, concurrent drying, countercurrent cooling, screening and recycle of the cyclone and screened fines.

The plant is designed for a production rate of 25 tons per hour of semi-granular, or 17 to 22 tons per hour of granular screened product averaging from -6 to $+20$ mesh size. Since fuel for drying is cheaper than the by-product chemical heat obtained from the reaction of acid with ammonia, equipment was sized liberally to permit maximum economy in formulation and low acid usage on all grades of product.

Stacking the processing compounds, Fig. 2, ammoniator, granulator, drier and cooler, provided complete gravity flow through these units and reduced the number of elevators and conveyors to a minimum. An inclined belt conveyor brings raw material to the screen, Fig. 1, from where it is distributed with mill tailings to nested surge bins with a swing chute, remotely controlled by the raw-material lift-shovel operator. The

use of inclined conveyors to distribute raw materials, Fig. 4, and pick up the cooler discharge, Fig. 5, obviated the need for conveyor pits.

Thorough attention was given to hazardous conditions throughout the plant. This included a completely enclosed control room with an interior window giving a view of the ammoniator discharge. In cases of possible difficulty with the ammonia system an outside door in the control room leads to an escape ladder. The main operating floor, Fig. 3, provides access from the control room to the ammoniator, granulator, and product screen as well as the exhausters, cyclones and scrubbers of the dust collector system.

Control of dust is accomplished by wet scrubbers on the ammoniator and drier exhausts in the new plant, and exhausters, cyclones and wet scrubbers to take care of dust in the raw-material unloading and product-bagging areas in the existing plant. In the future, it is planned to install pumps which will recycle the scrubber water and sludge to the ammoniator for complete recovery of both solids and insoluble materials removed from the exhaust streams.



Left: 3,000 citrus plants grown at the Jealott's Hill Research Station during work on citrus pests.



Center: Dr. R. Ghosh, the discoverer of Tetram, began the basic study of the organo-phosphorus compounds in 1949.



Right: The orange on the right is affected by rust mite and is much smaller than the healthy fruit. This picture was made in Texas, following a trial with the new acaricide.

TETRAM

"TETRAM," an acaricide discovered by chemists of Imperial Chemical Industries, Ltd., London, England, in 1952 and developed since then by field entomologists and chemists of Plant Protection Ltd., London, is said to be the most active and one of the most persistent chemicals ever developed for killing fruit tree red spider; spider mite, rust mite, and scale insects on citrus; and spider mites on cotton.

Plant Protection Ltd. are the sole manufacturers and suppliers of this systemic acaricide and own the "Tetram" trade mark. A finely granular, non-dusty, organo phosphorus compound, Tetram is water soluble. The chemical name for it is O,O-diethyl-S-(beta diethylamino) ethyl phosphorothiolate hydrogen oxalate. Discovered by Dr. R. Ghosh at the Jealott's Hill Research Station in England, Tetram is a result of a study of the organo-phosphorus chemicals that began in 1949.

It was tested biologically during the 1953 and 1954 seasons against red spider mite on apples in Essex and Suffolk under the supervision of E. C. Edgar of Jealott's Hill. At the conclusion of the tests, Jealott's Hill re-

search workers handed the material over to Plant Protection Ltd. for further development.

For the last three years, field entomologists from Plant Protection's Fernhurst Research Station have been conducting large scale trials. In England, P. D. Scott laid down trials with apple trees in which over 200 acres were sprayed in 20 different orchards. In 1956 Dr. J. W. Robson of Fernhurst and G. L. Baldit and Brian Leigh of the Yalding, Kent, laboratories of Plant Protection Ltd

went to Texas where 260 acres of cotton were sprayed on 20 different sites, both from the ground and the air, and 150 acres of citrus.

Tetram has been tried out also in large scale experimental work directed from Fernhurst on a variety of pests in South Africa, France, Cyprus, and Lebanon. In addition, tests have been conducted in Holland, Italy, Denmark, Argentina, Uruguay, Chile, Mexico, Brazil, Australia, and Japan.

Residues from these trials were assessed at the Laboratories in Yald-

A cotton plant affected by red spider. The clean leaves at the top grew after Tetram had been applied.





Left: Continuing counts are made to assess the value of an insecticide against red spider at Jeallott's Hill Research Station.

Center: Discovering the systemic activity of Tetram. The plant in the right foreground has been treated with Tetram, killing the aphids, while the aphids on the other plants are unaffected.

Right: E. C. Edgar of Jeallott's Hill making a count of red spider mites on bean leaves.

New English Acaricide for Pests of Fruit and Cotton

ing and, at the conclusion of the tests, Plant Protection Ltd, announced that they were satisfied that Tetram would fulfill its promise on red spider.

Fundamental work on the scale pests of citrus was carried out in the experimental glasshouses at Jeallott's Hall on 3,000 young citrus plants. Tetram was tried out on the scale insects with promising results. These results were confirmed in the field when Dr. F. Baranyovits, a Hungarian entomologist working at Jeallott's Hill, went to the Citrus Experimental

Station, Riverside, Calif., in 1955 and 1956. Dr. Baranyovits found the fundamental work done in England to be of the greatest possible use in a large citrus area and, in collaboration with Dr. Metcalf of Riverside, established the value of Tetram against the scale insects.

The Fernhurst station of Plant Protection Ltd., working in many cases with overseas associate companies, has compiled brief resumes of trials which have been conducted by members of the staff.

Tests on apples in the United Kingdom, for example, have shown that the best time to apply is at the second post-blossom spray, in mid-June. A typical example of the achievements of Tetram reported by the company is a trial in which only three mites or eggs per hundred leaves still survived in September compared with over 1,000 using a standard acaricide.

In two season's trials in Cape Province, South Africa, on apples and pears, an exceptional kill of red spider mite and Bryobia mite was reported. One application maintained control for more than two months.

Control of mites on apples and peaches in France was obtained with less than one ounce in 100 gallons of water.

In Texas, trials on cotton disclosed that one application of $2\frac{1}{2}$ ounces per acre eradicated red spider mite in 24 hours and prevents re-infestation for seven weeks.

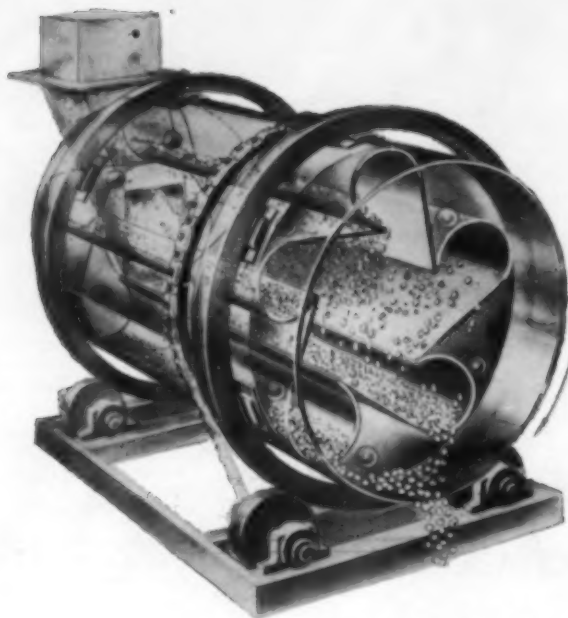
High volume applications of 40 p.p.m., using 2,500 gallons of wash, were found necessary in California to eradicate scale from the trunks and branches of fully grown citrus trees.

(Continued on Page 122)



Tetram is poured into the tank of an airplane before spraying a cotton field in Texas.

The
Sackett
Star®
Granulator



*U.S. and Foreign Patents Pending

THE Sackett Star Granulator was installed at our (Fertilizer Manufacturing Co-op.) Baltimore plant, May 15, 1956. This report summarizes our actual working experience, and results obtained from this new machine.

All of us, manufacturing granular fertilizers, have at times taken hands full of the hot ammoniated damp material direct from the ammoniator to roll from palm to palm obtaining good conditioned granules. In principle, the working characteristics of the Star Granulator are identical. Frankly, we were somewhat concerned, before installing this new machine, fearing the damp ammoniated mass flowing from the ammoniator into the Star Granulator would gum up the rolling trays and cause a continuous cleaning problem. Our fears did not materialize. The 15 heavy steel balls, 3 for each rolling tray, inserted between the steel shell of the granulator and the steel shell of the rolling trays, tap sufficiently to keep the equipment self cleaning.

We have operated the Star Granulator at Fertilizer Manufacturing Co-op. five months and are very happy with the outstanding results obtained. Comparing our experience with the conventional granulator, we found that the Star Granulator pro-

duces a more uniform, closer sizing of granules, less fines to recycle, less oversize to be crushed, no plugging in chute feeding our dryer, less water added to aid granulation, more efficiency in the dryer and cooler, lower drying costs for fuel and, most important, higher product recovery.

Complete operating control records have been kept of our granulating operations since we started manufacturing 18 months ago, therefore, we are well qualified to give the results obtained from the Star Granulator versus the conventional granulator. The studies made are real and factual data. On each 8 hour shift of our granular operation, a detailed record is kept of temperatures at intake and exit of dryer, exit of cooler, finished product to storage, ammoniator and granulator product and air intake. Also recorded are formula used, water added, cubic feet of gas used, screen tests of the cooled granulator material before classifying to give us the record of product recovery, fines to be returned, oversize to be crushed, final product to storage, weather conditions and other miscellaneous data.

To be absolutely fair with our comparisons of recovery results obtained from the Star Granulator, careful consideration was given to the

method used to establish the data—to be sure nothing was done to exaggerate a favorable report for the Star Granulator or an unfavorable report for the conventional granulator. We decided to make the study, using 10-10-10, 8-16-16, 6-18-18 and 6-12-12 grades. These four grades represent about 95% of the total tonnage of all grades of granular shipped by Fertilizer Manufacturing Cooperative. We picked at random 10 reports of our day-to-day operation of each grade, and averaged the results shown 12 thru 16.

I shall not get into any controversy as to whether granulation operations should have both the ammoniator and the granulator, because about 50% of the operators I have had contact with state definitely that even the conventional granulator is effective, and 50% state that they can see no benefits. I, personally, am satisfied the granulator offers real benefits and helps considerably to do a better job.

Before installing the Star Granulator, we were classifying our product with 4 mesh top and 35 mesh bottom standard opening screens. Soon after installing the Star Granulator, our recovery improved to permit changing our classifying recovery screens to 4 mesh top and 24 mesh bottom standard opening screens. We are now confident we can use closer sizing, and plan to change within a few weeks to 5 mesh top and 20 mesh bottom standard opening screens.

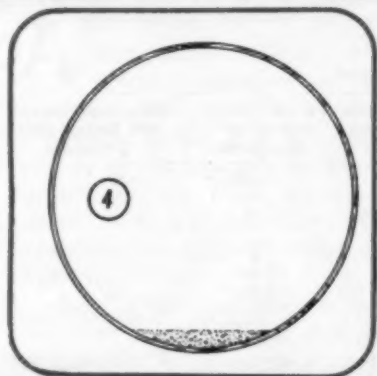
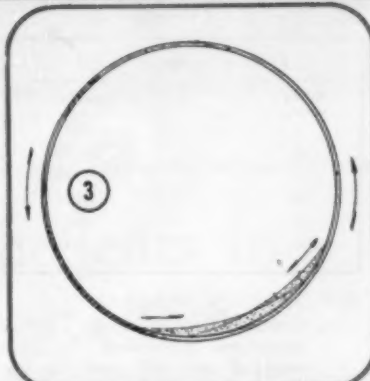
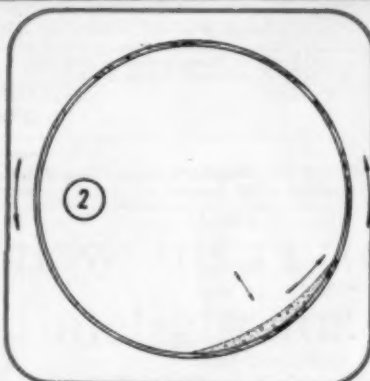
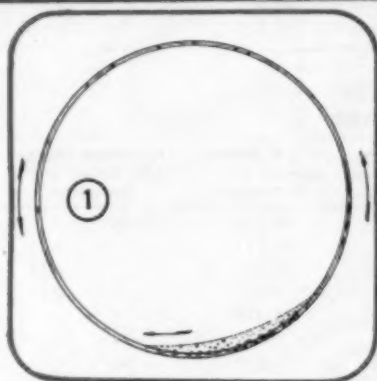
The Sackett Company, in my opinion, have made an outstanding revolutionary contribution in the de-



OPERATION OF A NEW GRANULATOR AT FERTILIZER MANUFACTURING COOPERATIVE

... by ALBERT SPILLMAN*
Fertilizer Manufacturing Cooperative

*Presented at the Fertilizer Industry Round
Table, Washington, D. C., Oct. 1956.



Conventional Granulator:

1. Material at bottom of slide.
2. Material at top of climb.
3. Composite view showing climbing and sliding action.
4. Material at rest.

Sackett Star Granulator:

5. Initial action at feed end.
6. Intense rolling action.
7. Continued rolling action at mid-point showing snow balling into granules.
8. Completion of rolling action at discharge showing firmed-up granules ready for drying.

velopment of the Sackett Star Granulator, and we were very happy to do the major experimental plant operating work.

In the past year, we have added a gas hot-water system for furnishing up to 4000 lbs. of 180 degree heated water for use in ammoniation, when water is required mostly in lower nitrogen granular formulas. Adding hot water versus cold water reduces water to be added, and saves fuel to drive off excess moisture.★★

Testing Screens Used

Mesh	Openings
4	.187"
10	.065"
20	.0328"
24	.0276"
35	.0164"
100	.0058"

KEY TO FLOW DIAGRAM

- (1) SUPPLY HOPPERS AND BATCH WEIGHING EQUIPMENT—Cranes equipped with 2½ yard (approximately 2½ ton) clam-shell buckets pick up the raw materials from bins in the cranebay and load the overhead large supply hoppers. From these hoppers the required weight of each material called for in the formula is weighed into hopper scales and dumped on conveyor belts which empty into a vertical elevator to lift the materials into the mixer for blending.
- (2) MIXING AND SCREENING UNIT—All of the dry materials are assembled by batch method and thoroughly blended through a Sackett Gravity 1 Ton Mixer. From the mixer each blended batch is dumped into a vertical bucket elevator and lifted to a single-deck Tyler-Niagara 4' x 8' screen. The screen (4½ mesh) screens out all of the foreign material, the oversize is put thru a Sackett #10 pulverizer for recycling. Screening conditions the dry batch for ammoniation.
- (3) SOLID AND LIQUID PROPORTIONING EQUIPMENT—The continuous operation begins at this point. The Batch blend of solid ingredients is converted to an accurately controlled Poidometer belt scale receiving its feed continuously from the supply hopper directly above. Rotometers and flowraters control continuously the flow of liquid nitrogen solutions, sulphuric acid and water. The dry blended batches flow from scale-belt into the ammoniator. The liquids flow into the ammoniator, thru pipes, under a deep cascading bed of the solids.
- (4) CONTINUOUS AMMONIATOR AND SACKETT STAR GRANULATOR—The rotary T. V. A. developed ammo-

(Continued on Page 113)

6-12-12 GRANULAR

Screen Tests Represent Average of 10 Samples		Conventional 6' x 8' Rotary Granulator	6' x 8' Rotary Sackett Star* Granulator	Percentage Change with Sackett Star* Granulator
ON	4 Mesh	8.072	4.441	-45
ON	10 Mesh	29.528	42.980	+45
ON	20 Mesh	29.729	36.103	+21
ON	24 Mesh	13.982	4.369	-69
ON	35 Mesh	12.095	8.955	-26
ON	100 Mesh	7.670	3.152	-59
THRU	100 Mesh	.294	—	-100
Recovery Before Classifying				
Minus	4 Mesh Plus 20 Mesh	57.257	79.083	+38
Minus	4 Mesh Plus 24 Mesh	71.239	83.452	+17
Minus	4 Mesh Plus 35 Mesh	83.334	92.407	+11

* U. S. and Foreign Patents Pending.
** NOTE:—Coarse Potash Used.

10-10-10 GRANULAR

Screen Tests Represent Average of 10 Samples		Conventional 6' x 8' Rotary Granulator	6' x 8' Rotary Sackett Star* Granulator	Percentage Change with Sackett Star* Granulator
ON	4 Mesh	15.622	11.193	-28
ON	10 Mesh	34.110	42.637	+25
ON	20 Mesh	17.404	23.427	+35
ON	24 Mesh	3.704	4.333	+17
ON	35 Mesh	12.489	11.888	-5
ON	100 Mesh	15.159	9.425	-38
THRU	100 Mesh	1.252	.095	-92
Recovery Before Classifying				
Minus	4 Mesh Plus 20 Mesh	51.514	66.164	+28
Minus	4 Mesh Plus 24 Mesh	55.218	69.868	+26
Minus	4 Mesh Plus 35 Mesh	67.707	81.756	+21

U. S. and Foreign Patents Pending.

8-16-16 GRANULAR

Screen Tests Represent Average of 10 Samples		Conventional 6' x 8' Rotary Granulator	6' x 8' Rotary Sackett Star* Granulator	Percentage Change with Sackett Star* Granulator
ON	4 Mesh	8.053	3.186	-60
ON	10 Mesh	29.021	34.581	+19
ON	20 Mesh	19.730	27.484	+39
ON	24 Mesh	5.093	7.064	+39
ON	35 Mesh	18.887	19.642	+4
ON	100 Mesh	18.283	8.043	-56
THRU	100 Mesh	1.032	—	-100
Recovery Before Classifying				
Minus	4 Mesh Plus 20 Mesh	48.751	62.065	+25
Minus	4 Mesh Plus 24 Mesh	53.844	69.129	+28
Minus	4 Mesh Plus 35 Mesh	72.731	88.781	+22

* U. S. and Foreign Patents Pending.

6-18-18 GRANULAR

Screen Tests Represent Average of 10 Samples		Conventional 6' x 8' Rotary Granulator	6' x 8' Rotary Sackett Star* Granulator	Percentage Change with Sackett Star* Granulator
ON	4 Mesh	5.626	4.364	-22
ON	10 Mesh	21.596	40.182	+86
ON	20 Mesh	36.287	40.545	+12
ON	24 Mesh	6.259	5.818	-7
ON	35 Mesh	14.052	7.455	-47
ON	100 Mesh	15.331	1.636	-89
THRU	100 Mesh	.843	—	-100
Recovery Before Classifying				
Minus	4 Mesh Plus 20 Mesh	57.883	80.727	+40
Minus	4 Mesh Plus 24 Mesh	64.142	86.545	+35
Minus	4 Mesh Plus 35 Mesh	78.200	94.000	+20

* U. S. and Foreign Patents Pending.

** NOTE:—Coarse Potash Used.

Tabutrex being sprayed on dairy cows. Tests showed the repellent kept flies away for days—sometimes weeks.



new insect repellents in limelight for pest control in dairy, stable or home

A SERIES of new, effective and relatively long-lasting insect repellents is currently sparking more interest in the subject on the part of insecticide formulators, than has been evidenced since the early '40's. Glenn Chemical Co. has just brought "Tabutrex" onto the market; McLaughlin Gormley King Co. has two new products, MGK Repellent 11 and MGK Repellent 326; while Hercules Powder Co. and more recently Montrose Chemical Co. have started manufacture of diethyl toluamide.

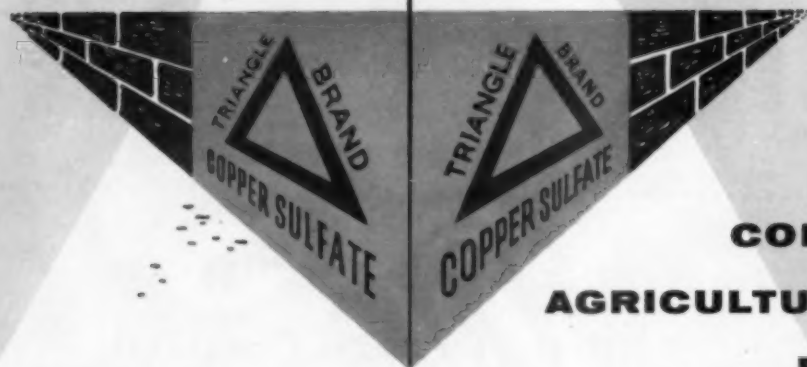
Some of these new products, incidentally, had been screened at Orlando, Florida, back in 1943, when under the influence of the war time need for protection of troops in the field against malaria-bearing mosquitoes and other flying insects, government research workers were seeking repellents which would be superior in effectiveness against mosquitoes, chiggers, etc. Out of that work came Rutgers 612 (2-ethylhexanediol-1,3), indalone, and dimethyl phthalate. Rutgers 612 proved to be particularly effective against *aedes aegypti* mosquitoes; indalone against chiggers; and dimethyl phthalate against anopheles mosquitoes. A 2:2:6 combination of the three materials was supplied to the armed forces to give a wide pattern of protection.

It is interesting to note that Tabutrex was among the materials tested as a mosquito repellent at that time. Since it did not prove superior for mosquito control, it was bypassed in favor of more effective materials without its value as a fly repellent being realized. It seems rather unusual that such a long period should have

elapsed before its fly and other pest repellent properties were recognized. The marked effectiveness of indalone as a fly repellent for the armed forces evidently satisfied the need at that time.

Between 1943 and 1957 there was only one major development in the repellent field: the introduction of Crag Fly Repellent (butoxy polypropylene glycol), which was promoted by its manufacturer, Union Carbide Corporation, New York, for use in cattle sprays, to add a repellent effect to the fly killing role of other ingredients in the spray. Carbide pioneered the idea of adding repellency to a cattle spray, but it is interesting to note now that some of the newer repellents are being recommended as a single and sufficient ingredient, with no toxicant required, even as a supplement to the repellent. Clearly the new materials now being introduced should widen use of repellents for fly control on cattle.

In addition to a wider market in cattle sprays, some of the new repellents promise to open up other fields of application in protection of play and living areas for suburbanites. New products will be coming on the market, we are told, for fly control around the four P's:—patio, pool, porch, and picnic table. If such products prove to be effective in use, a new market can be built for insect repellents which may dwarf the former sale. Apart from wartime, the market for repellents for use on the human skin has always been a relatively small one, limited to fisherman, golfers, etc.—and with the period for which former repellents could be counted on to be effective ranging up to only a few hours under



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most favorable circumstances, dissatisfaction of the user with product performance limited potential growth of the market.

One of the newer products, Tabutrex, manufactured by Glenn Chemical Co., Chicago, and just launched by them in a full scale program to the agricultural, industrial, and household insecticide market, emphasizes the new concept of insect control—acting as a barrier to insects, keeping them away from their prey, rather than killing them after they may already have found and attacked it. Contrasted with the earlier repellents, which were designed primarily for mosquitoes and flies that bite man, Tabutrex may find its widest field of use as a fly repellent for use on livestock and in buildings as a repellent for houseflies and other insects.

Chemically, Tabutrex is di-n-butyl succinate. A colorless, odorless liquid, it offers several advantages to the formulator and user: it is miscible with petroleum distillates, petroleum ether, alcohol and acetone, emulsifiable in water with suitable emulsifiers, unusually stable in all recommended formulations, and is not corrosive. What is most important in this day of concern for pesticide hazards, Tabutrex is considered by its manufacturers to be among the least toxic materials ever used for effective insect control. It has been registered by the USDA for use on dairy and beef cattle, to repel house flies and biting flies, and as a roach and household ant repellent.

The repellent properties of the material are reported to be particularly advantageous in locations such as kitchens and food processing plants, where it is often undesirable to destroy insects, inasmuch as dead or dying insects may contaminate food. For livestock protection, it is the function of an effective repellent to prevent the flies from biting the animals, rather than simply kill them. When slow acting toxicants are used that do not contain repellent properties, the fly alights, bites, then flies away. Although the toxicant may destroy the fly, usually it does not prevent the discomfort which arises when the fly

pierces the animal's hide and withdraws blood. Although the fly is killed, a certain damage is done by its annoying visit and its ability to draw blood. There is discomfort to the animal and consequent loss of weight or a reduced content of butter fat in milk produced. The manufacturers of Tabutrex emphasize that the repellent avoids this situation: it prevents the fly from alighting, and minimizes damage to treated livestock.

On the other hand, it is pointed out that where a combined effect of a rapid kill of the insects together with a continued residual repellency is desired, Tabutrex may readily be formulated with synergized pyrethrins or chlorinated hydrocarbons. It is emphasized, however, that Tabutrex is not an additive, and does not require the addition of insecticides for its own effectiveness as a repellent.

There have been no indications of insect resistance to Tabutrex, and the manufacturers observe that an effective repellency control of flies and roaches that are known to be resistant to certain insect toxicants may be accomplished with this new repellent.

Screening in the laboratory with respect to control of a number of insect species other than flies and roaches shows Tabutrex promising against the Lone Star Tick, night flying insects, confused flour beetles, box elder bugs, termites, *drocophila*, and certain ants.

Patents have been applied for Tabutrex in the United States and all principal foreign countries by Glenn Chemical Company, Incorporated.

Of MGK's two new products, Repellent 11 is the older brother, being already on the market. R-326 will be available, we are advised, in about a month. Ample supplies of R-11 will be obtainable this season, while production of R-326 is starting on a small scale and supplies will be limited for the time being.

R-11 is recommended primarily for use as an additive, while R-326, like Tabutrex, may be employed effectively by itself. R-11 has demonstrated effectiveness against mosquitoes and roaches, in addition to stable flies, horn flies, and gnats, while R-326 is strictly a fly repellent and is not recommended for use against mosquitoes and roaches. Both products may readily be formulated as aerosols.

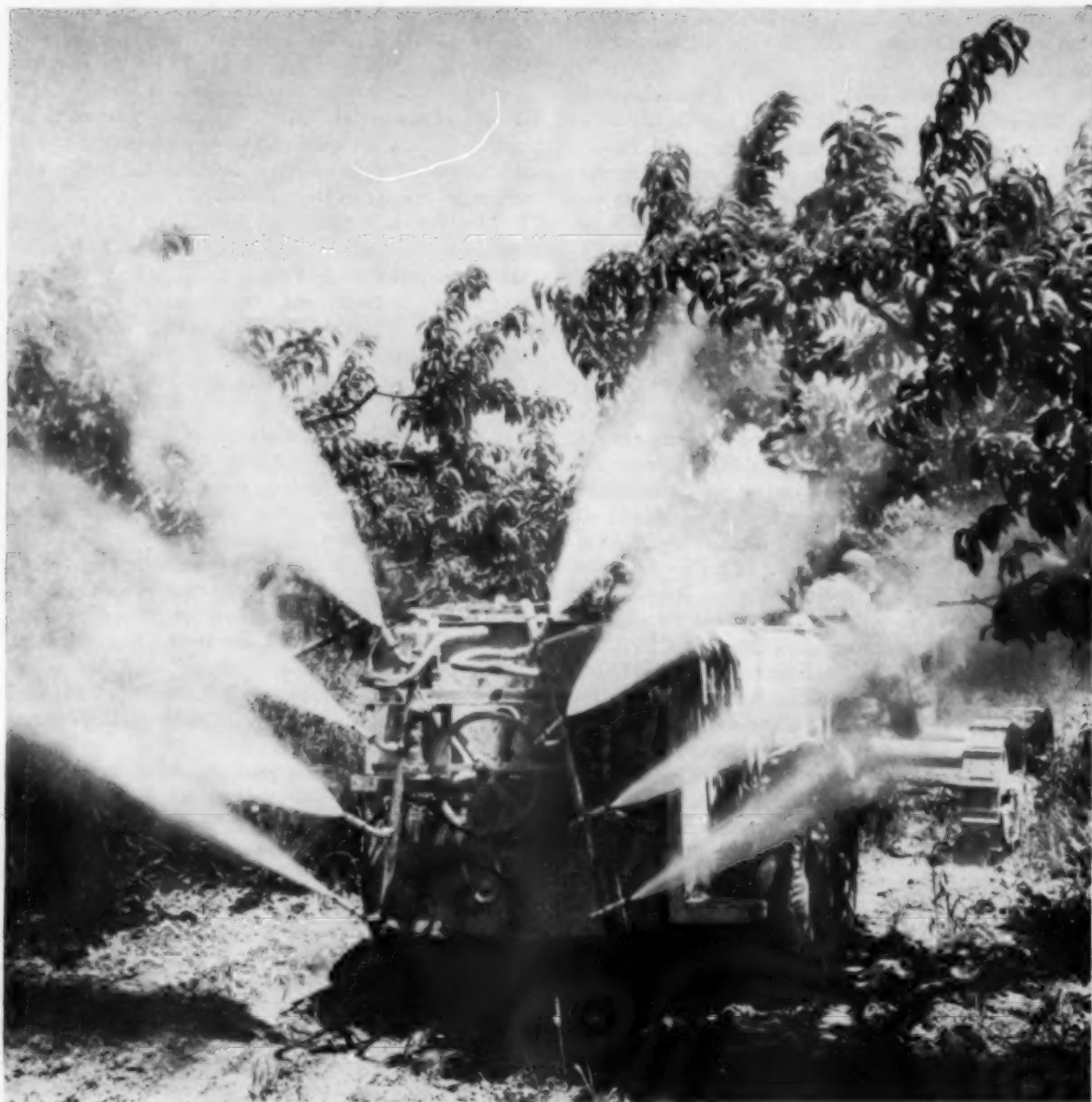
These two new repellents are a product of research work at Phillips Petroleum Co., but will be marketed by MGK. Full data are available in two new bulletins which MGK is currently distributing. Chemically, R-11 is 2,3,4,5-bis (2-butylene)-tetrahydrofurfural. It is said to be less toxic than pyrethrins to warm blooded animals. It is recommended that it be used at .2 per cent by weight in the finished spray, whether it be an emulsion in water or an oil spray. It is compatible with chlorinated hydrocarbons and phosphorus insecticides, but is recommended primarily for use with pyrethrins, allethrin and synergists such as MGK 264 or piperonyl butoxide.

R-326 chemically is di-n-propyl isocinchomeronate. It is repellent to houseflies, horn flies, stable flies, and horse flies. Like R-11, it can be used in either oil or

(Continued on Page 130)

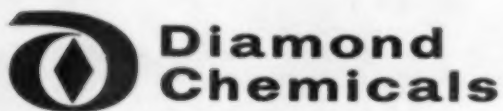
Dr. Willis N. Bruce, associate entomologist of Illinois Natural History Survey, Champaign, Illinois, demonstrates the effectiveness of Tabutrex against house flies in a turntable repellent tester cage. Each of the small paper cups holds a lactose pill, extremely attractive to flies. The house flies avoid the Tabutrex-treated cups but infest the untreated cups.





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AGRICULTURAL CHEMICALS

Spray Program Against

GYPSY MOTH

Continuing Despite Protests

DESPITE scattered, but intense, opposition, the Department of Agriculture's spray program for control of gypsy moth is currently continuing over almost three million acres in New York, New Jersey, and Pennsylvania.

Opposition to the spraying has been voiced by such groups as; organic gardeners, naturalists, bird watchers, and fishermen, the same groups who opposed the Mediterranean fruit fly spraying in Florida last year. Fortunately, they were not listened to

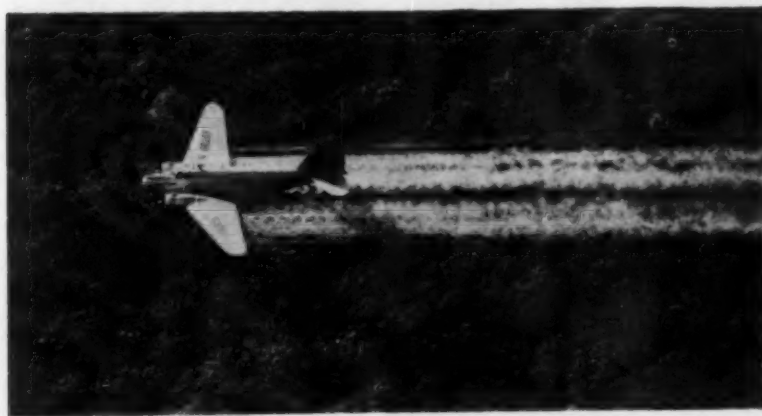
then and they are not being heeded now.

Complaints filed in Federal Courts hold that the spraying is likely to upset the balance of nature. A rod and gun group in New York State is concerned over possible damage to fish and stream-bed insect life and the spray has been accused of ruining the Rockland County (New York) strawberry crop and killing off most of the county's bees. So far, however, no evidence of actual damage has been presented.

What these well-meaning critics of the program apparently fail to realize is that if they don't run the small risk of killing a few birds and fish now, the gypsy moth would continue its spread unchecked and eventually kill whole forests in the north-eastern United States.

While opposition to any spray program can always be expected, the sensational-type publicity given to critics of this program by some of the New York newspapers prompted three government agencies to step in and endorse the safety of the spraying. The three agencies are the Public Health Service of the Department of Health, Education, and Welfare; the Fish and Wildlife Service of the Department of the Interior, and the Agricultural Research Service of the Department of Agriculture.

The three agencies emphasized that DDT, when used in the manner specified for eradication of the gypsy moth, is not injurious to man or farm animals, it offers slight if any hazard to birds and other wildlife, and is not likely to have any serious effect on fish populations in the sprayed areas.



A multi-engine plane sprays a DDT-oil solution over an infested area. The insecticide remains effective for at least three weeks.

The trees on the right side of the road have been stripped of their foliage and killed by the gypsy moth. Trees on the left were protected by DDT spray. Photo on right shows female moths laying eggs on a tree trunk.





Traps baited to attract male gypsy moths are used to locate new infestations and check on effectiveness of aerial spraying. Over seven million acres were trap-surveyed last summer.

In addition, the U.S.D.A. pointed out that eradication of the gypsy moth with a single DDT treatment on a community-wide basis involves far less hazard than to be forced to control the infestation by repeated local treatments on an annual basis.

The spraying program, which started in mid-April and will continue until the middle of June, is part of a combined program aimed at eventual complete eradication of the pest. About five million dollars have been appropriated by state and federal governments for gypsy moth control and eradication programs in the nine northeastern states during the current season. More than half of this amount is being used in the spray program. State control operations are continuing, also, in other infested portions of the nine states.

One of the major underlying causes for this year's all-out campaign against the gypsy moth is the out-

break of 1953 and 1954, which was the most intense and widespread of any yet experienced in this country. Until 1953, a cooperative federal-state regulatory and control program had proved successful in confining infestation to the New England area and a narrow strip in eastern New York. Recent surveys, however, have established a light but scattered infestation over some eight and three-quarters million acres to the south and west.

Unless the western boundary of infestation can be restored to the Berkshires and the Green Mountains, where forest growth is largely resistant to gypsy moth attack, and an effective quarantine can be maintained at reasonable cost, the U.S.D.A. fears that natural spread of the moth to the west and south will continue at an accelerated rate.

The spraying companies employed for the project are using 16 multi-engined planes capable of ap-

plying 500 gallons or more of spray in one trip, and 32 single engined craft, such as Stearmans, Pipers, and helicopters, which can carry from 100 to 150 gallons of insecticide spray.

Spraying is done with a single application of one pound of DDT dissolved in one gallon of light (diesel) oil per acre.

Contracts for the spraying, totaling approximately \$1,750,000, were awarded to Lebonair Inc., Lebanon, Pa.; Chris D. Stolz, Coatesville, Pa.; and Roberts Aircraft, Boise, Idaho. As this issue went to press, almost 900,000 acres had been treated out of the 2,841,000 scheduled. All 186,000 acres in New Jersey and 15,000 of Pennsylvania's 125,000 infested acres had been sprayed.

Half of Long Island's 600,000 acres had been treated. In the rest of New York State, 432,000 acres out of the planned 1,940,000 had been sprayed.

Effective spraying can be done only from about May 1 to June 15 because the gypsy moth larvae hatch during that period. The larvae cause damage amounting to hundreds of thousands of dollars annually by defoliation which reduces the market value of timber and may ultimately kill the trees. They attack mainly oak, poplar, willow, birch, and apple, but to a lesser degree they also feed on cherry, hickory, gum trees, and evergreens.

Normally the natural spread of the gypsy moth is relatively slow. The

(Continued on Page 119)

The leaf-eating caterpillars of the gypsy moth damage hundreds of thousands of dollars worth of trees each year. Caterpillars hatch during the middle of April.



A C-118 airplane is loaded with DDT-oil solution from tanks in the background. Spraying is done in early morning hours when the air is still.



Arcadian® News

Volume 2

For Manufacturers of Mixed Fertilizers

Number 6

DO YOU NEED EXPERT HELP ON A PRODUCTION PROBLEM?

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That's why Nitrogen Division, Allied Chemical, maintains a large and well-qualified staff of technologists to provide its customers with expert technical assistance. This staff includes hundreds of fertilizer technicians, scientists and engineers working with millions of dollars worth of laboratory and pilot plant equipment including an electronic computer.

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When your Nitrogen Division salesman offers to provide you with technical assistance, he is prepared to enlist the aid of a technical service staff larger than the sales force of which he is a member. These men are ready, willing and able to help you find the practical answer to your problem. The accumulated skill of many years of experience augments your own efforts. And this service is available to customers without charge.

These men work on your problem in your plant or in their laboratories using the most modern facilities. They are skilled in ferreting out trouble spots and in recommending new and more economical operating practices. Their aim is to make your plant work efficiently with the least possible adjustment in equipment and personnel. The assistance they give you parallels their extensive and enterprising research in the development of methods and materials



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to cut costs of producing high-quality pulverized and granular complete fertilizers in plants everywhere.

Nitrogen Division does not sell factory equipment. Nitrogen Division supplies the most complete line of nitrogen products and renders the best available service on the use of nitrogen in fertilizers.

Nitrogen Division technologists originated nitrogen solutions and the profitable practice of ammoniating superphosphate. Through the years this practice has been constantly expanded and improved through new products and processes. Nitrogen Division has also introduced many other changes in industry-wide practices.

Nitrogen Division technical service is not confined to ammoniation problems and fertilizer formulation. Staff men have a thorough knowledge of the entire operation of a fertilizer plant. They often assist in the selection of equipment and in the suggestion of more efficient, money-saving methods all along the production line.

This service is available to Nitrogen Division customers without charge, in the interests of the better use of nitrogen in fertilizers. Get the facts from your Nitrogen Division salesman . . . or contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y. Phone: Hanover 2-7300.



FOUR MILLION BABIES A YEAR ARE BUILDING FOOD MARKETS!

At the rate our population is growing, we'll need 25% more crop production by 1975. In the meantime we are losing a million acres of farmland per year to homes, highways and factories. This loss of farmland is barely offset by our increase in irrigation, in draining swamps, and in plowing up permanent grassland. De-salting seawater is too expensive to give us a practical new supply of irrigation water. So our increase in crops must come largely from increased acre yields.

Better Diets

We cannot afford to let the present temporary plateau in crop production blind us to the future. True, we have increased farm production by a tremendous 40% since 1940. In that period our population expanded from 132 million to 170 million, an increase of 29%, and we upgraded our diet, with more eggs, meat, milk, fruits and vegetables, and fewer cereal foods and potatoes. During the war we also shipped much food abroad. Since the war some of our "surplus" has also gone abroad but this is a small percentage of our annual food production.

Population growth will soon demand

more food, and we will probably continue our upgraded eating habits. Our population will really boom after 1960. Right now our nation produces four million babies and we lose about one million older persons per year. This is a net gain of three million extra mouths to feed per year. By 1965, when the big baby crops of the 1940's have grown up and start having babies of their own, population will climb even faster. By 1975 we may have 220 million people to feed—50 million more than today.

We are Losing Farmland

By 1975, we can hardly expect to have more good productive land on which to grow crops. Our present loss of a million acres of farmland per year to homes, roads and industry may be speeded up. We will have to farm the land we have better. And that means a fast-growing market for fertilizer, farm machinery, weed killers and other farm chemicals. Some statisticians may point out that several million acres of land have been returned to food production by the decrease in acreage of cotton, tobacco, and feed crops for our fast-disappearing horses and mules. But other millions of

acres have been taken out of food production to grow pulpwood and Christmas trees. Even these acres, along with other woodland, will become a market for fertilizer.

Farms are Getting Bigger

We are now using 22 to 23 million tons of fertilizer per year. Good farmers on big farms have been using most of it. The number of farms has been decreasing, while good farmers have been buying more land. That means fewer total prospective customers for fertilizer, but more big customers as farms get bigger. And good farmers will be quick to respond to population pressure that improves markets.

What will an extra three million people eat in a year? They'll eat an extra 270 million pounds of beef, for example. And an extra 235 million pounds of pork, and an extra 540 million quarts of milk. By 1975, 50 million more people in the nation will need 25% more food than we eat now.

If our crop yields per acre should stay the same as in 1951, we would need 150 million more acres of cropland by 1975. We won't have the land. But we will

have enough fertilizer to build these higher crop yields on our present acres.

Now, only 60 per cent of our corn land gets any fertilizer at all, and the average amount of fertilizer per acre on fertilized corn is less than 300 pounds. When we need more corn, fertilizer will grow it! More good farmers will use fertilizer on all their corn crop, at rates of 500 to 1,000 pounds per acre.

Other large-acreage crops get less fertilizer than corn. Only 29 per cent of our wheat acres and 26 per cent of our improved pastures are fertilized. Even with high-value crops like fruits and vegetables, only 68 per cent of the area planted gets commercial fertilizer. There is plenty of room for fertilizer tonnage expansion.

Bigger Yields are Essential

Population growth and the transfer of farm lands to other uses are making it vital that we be prepared to produce more food from each acre cultivated. That would seem to make land more vital to the farmer than ever before. But, as many farm leaders are already pointing out, land is becoming less important in farming. What farmers put into the land is what makes big crops and profits. Land, labor and equipment costs will continue to climb. The basic costs of preparing each acre for growing a crop will go higher and higher. It will take far bigger yields to make each acre pay off. And fertilizer can build these bigger yields at low cost per bushel or pound.

More Profit per Acre

Today a farmer figures he gets a return of \$3 to \$5 for every \$1 he invests in fertilizer. He may not boost this return per dollar very much, as he uses more fertilizer. But he will use more dollars' worth of fertilizer on each acre, to get a bigger crop yield and greater total net profit per acre. We will need more food, and fertilizer can produce it most profitably. Selling fertilizer in the years ahead will be a good and growing business—as well as a service to the nation!

It pays to have TWO Fertilizer Seasons!

For many years production, sales and use of fertilizers have been largely concentrated in one season. The success of a fertilizer manufacturer's entire fiscal year has depended on spring business.

Growth of interest in fall fertilization now offers fertilizer manufacturers a better opportunity to develop a two-season business. This would spread production, sales and deliveries over more months of the year. Although fall fertilizers will never match the tonnage of spring fertilizers, increased use of fertilizers in the fall can mean sounder operations and better profits for the fertilizer man and the farmer.

Farmers are now using fertilizers on a greater variety of crops in the fall. Small grains, pastures and vegetables have always been a good market for fall fertilizers. In recent years this fall market for complete plant foods has been expanding to include other crops. Each year farmers are learning more about the proper use of fall fertilizers. They are discovering time-saving and money-making advantages from fall fertilization of corn and other major crops on many soils.

The Soil is a Warehouse

Most soils are an excellent place to store fertilizer through the winter. Storage of phosphorus and potash in the soil has never been a problem. High-nitrogen fertilizers are also practical for fall use, except on sandy soils in heavy rainfall areas.

More high-nitrogen complete fertilizers are being used in the fall for plow-

down with crop residues, and on sod, cover crops and small grains. One of the biggest vegetable farms on the sandy Atlantic Coastal Plain applies all fertilizer but row starter fertilizer on cover crops in the fall. Their agronomists figure that well-fertilized cover crops are equal to one ton of fertilizer plus 10 tons of manure per acre.

Better Crops with Less Labor

Most corn land can profit from fall plow-down of fertilizer, or fall top-dressing of stalks or cover crops. Even on land to be planted to cotton and sugar beets, agronomists recommend fall application of phosphate-potash mixtures, especially with a cover crop. For alfalfa, fall application of fertilizer high in phosphate and potash helps maintain thick stands and profitable yields. Many fruit crops can be fertilized to advantage in the late fall.

Agronomists point out that hayland and pasture in the North should get fertilizer late in the fall so that plant food will be stored in the roots for an early spring start. In the South, oats, wheat, rye and other grazing crops need heavy fall fertilization to provide pasture plus a profitable grain crop. In other winter grain areas, all the fertilizer can go on in the fall to produce equally as big a crop as split or spring applications would produce.

Labor shortages and high labor costs give every farmer the urge to use machinery and get more jobs done at other times than during the spring rush. Fall, with dry ground and slack time, is an ideal season to spread fertilizer by truck and other simple, fast, low-cost methods.

A 200-Million-Acre Potential

Many leading farmers are now using fall fertilizers with outstanding success. Expansion of this practice to other thousands of farms will make the fertilizer business more of a two-season business.

The corn, small grains, vegetables, fruit, pasture and hay crops now grown on soils adapted to fall fertilization represent a potential market of more than 200 million acres. Start now to get a bigger share of this market by aggressive promotion of fall fertilizers.



Tonnage Opportunities

Fertilizer manufacturers now have a better opportunity to develop more fall business.

NITROGEN *plus* SERVICE

There are many reasons why it pays you to deal with Nitrogen Division, Allied Chemical. You are served by America's leading producer of the most complete line of nitrogen products. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions for the fertilizer industry. You are assured of dependable supplies from three huge plants at Hopewell, Ironton, and

Omaha. Your nitrogen is delivered to you by the best transportation facilities and equipment. You get technical assistance and formulation advice from the largest and most efficient staff of nitrogen experts. Your sales are supported by the most powerful advertising campaign ever conducted to sell fertilizers. Nitrogen Division is your headquarters for NITROGEN *plus* SERVICE. Look over the big line and contact one of the 14 offices listed below.



Nitrogen Solutions

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. in. Gauge	Approx. Temp. at Which Salt Begins to Crystallize of
NITRANA®								
2	41.0	22.2	65.0	—	12.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	1.147	18	26
3	41.0	26.3	55.5	—	18.2	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	1.194	7	61
6	49.0	34.0	60.0	—	6.0	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	1.134	22	1
URANA®								
10	44.4	24.5	56.0	10.0	9.5	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	1.081	25	-7
13	49.0	33.0	45.1	13.0	8.9	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	1.052	29	1
U-A-S®								
A	45.4	36.8	—	32.5	30.7	0.925	57	16
B	45.3	30.6	—	43.1	26.3	0.972	48	46
Ammonia	82.2	99.9	—	—	—	0.618	211	—

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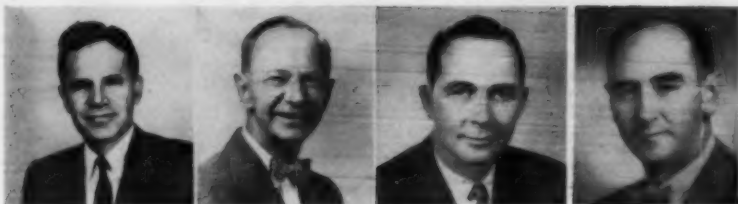


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AN outstanding feature of the 1957 convention of the National Plant Food Institute, at the Greenbrier, White Sulphur Springs, W. Va., June 9-12, will be a panel discussion on "How Big is the Fertilizer Market." Panel speakers are shown in the pictures above: E. T. York, American Potash Institute; Gordon D. Nance, University of Missouri; Wilbur Renk, Wisconsin farmer; and O. E. Anderson, Ohio Bankers Association.

More than 1,000 representatives of the fertilizer industry and agricultural leaders are expected to attend

Panel on Fertilizer Market— Feature at NPFI Meeting

the annual convention which will open with a meeting of the Institute's Board of Directors.

Russell Coleman, executive vice president, NPFI, will address the convention, discussing "How Your Institute Can Help Expand the Fertil-

izer Market." Another feature will be an address by Senator Karl E. Mundt (R-S.D.), member of the Senate Committee on Agriculture and Forestry.

The complete program for the meeting is given below.

JUNE 9TH, SUNDAY

Registration

Board of Director's meeting

JUNE 10TH, MONDAY

"How Big is the Fertilizer Market?" panel discussion, with moderator O. E. Anderson, Ohio Bankers Association

Panel speakers:

E. T. York, American Potash Institute—

"From the Soil and Crop Standpoint" Wilbur

Renk, Wisconsin farmer—"From the Farmer's

Standpoint" Gordon B. Nance, University of

Missouri—"From the Economic Standpoint"

O. E. Anderson, Ohio Bankers Association—

"From the Banker's Standpoint" "How Your

Institute Can Help Expand the Fertilizer Mar-

ket"—Russell Coleman, executive vice presi-

dent, National Plant Food Institute

Meeting of the NPFI Research and Education Committee

Hospitality Hour—Nitrogen producers hosts

JUNE 11TH, TUESDAY

"The Current Economic Outlook for Business,"

Raymond Rodgers, New York University

Senator Karl E. Mundt (R-S.D.), member of the Senate Committee on Agriculture and Forestry.

Soil Builders Award for Editors.

Hospitality Hour—Potash Producers, hosts

Banquet.



'56 FUNGICIDE TESTS

(PART 5)

dusts. The 4X concentrations of Manzate and Tribasic copper applied at 40 pounds pressure were equal to the 1X concentrations at two hundred pounds. All but Tennam and the two 4X concentrations are recommendable for grower use. The Variety Homestead was more susceptible than Rutgers.

ALTERNARIA, SEPTORIA, AND ANTHRACNOSE

Kemate (Dyrene) and maneb were superior to the established Zerlate-Bordeaux spray schedule in both the prevention of defoliation from Alternaria and Septoria and the occurrence of anthracnose fruit rot in New York, according to Shroeder. Captan was found to control the defoliation caused by Septoria blight rather well, but Kemate and Manzate were superior in over all control, with six field applications. The disease known as brown wall (grey wall, virus) was not controlled by any sprays and was found in 32 to 40% of the fruits in all treatments at the end of the season. (Table 57.)

TABLE 58

Control of Early and Septoria Blights and of Anthracnose Fruit Rot of Tomato in New York (32).

Material	Rate PPM ^b	% Defoliation	% Anthracnose at Harvest
Manzate	4 lb/a	17	10.6
CC-MMM (split program)	4-6 lb/a	21	15.9
Captan	6 lb/a	61	23.4
Griseofulvin	50	85	44.4
Griseofulvin	100	86	46.5
Actidione	5	86	44.2
3112-WH-126-1	10	84	51.6
3112-WH-126-1	20	81	50.3
3112-WHW-119-1	10	86	45.5
3112-WHW-119-1	20	83	44.6
3112-WHW-106-1	10	86	44.3
3112-WHW-106-1	20	86	45.0
3112-WH-126-1 ^a	20	88	49.3
Griseofulvin ^a	100	90	57.6
3112-WHW-119-1 ^a	20	92	54.3
3112-WHW-106-1 ^a	20	92	47.3
None		92	52.5

^aSprays applied at the rate of 100 gals./acre.

^bThese materials applied only on first, third and fifth application rates, all others received five applications.

New York Report

A number of antibiotics failed to give any control of defoliation from Alternaria and Septoria nor any significant control of Anthracnose fruit rot in New York. Manzate throughout, and a split program of two copper and three maneb sprays gave the best control of everything. Captan gave good anthracnose control at six pounds per acre application but failed to stop defoliation very well. No materials had any significant effect on brown wall (Grey wall) of fruit (a virus). (Table 58.)

BLIGHTS AND ANTHRACNOSE

From six weekly applications of ten liquid fungicides to replicated field plots at Geneva, Shroeder concluded that Kemate (B622, or Dyrene), Manzate and Dithane M22 were preferable to the Zerlate-Bordeaux program currently employed. Captan and Orthocide didn't control early blight as well, and the following were inadequate in controlling Septoria blight,

TABLE 57

Control of Early and Septoria Blights and of Anthracnose Fruit Rot of Tomato in New York (32)

Fungicide	Lbs./100 g	% Defoliation	% Anthracnose at Harvest
Kemate (Dyrene)	6	9	1.1
Manzate	4	9	1.4
M 22	4	10	3.1
Zerlate — Bordo	4; 16-8	13	2.8
Captan 50 WPTU	6	23	3.2
Captan 50 WP	6	24	2.8
Captan 50 W	6	24	3.0
Captan 50 WTU	6	26	3.5
Orthocide '56	6	34	3.4
Vancide M + COCS	2 + 2	31	7.3
Orthocide '52	6	35	5.9
HL — 859	6	62	23.1
Vancide — Z	4	75	17.7
Vancide — M	4	78	23.1
Tennam	5	82	22.3
ZnO	6	96	45.6
ZnO + Darvan (dispersant)	6	99	56.0
None		95	37.5

TABLE 59

Control of Tomato Blights at Geneva, New York (32).

Fungicide	Lbs./Acre Per Appl.	Control Rating	Exper. Pref.
Kemate (Dyrene)	6	1	1
Manzate	4	1	1
Dithane M22	4	1	1
Captan 50W	6	U-EB*	3
Orthocide 50W	6	U-EB*	3
Vancide-M	4	U-EB-S-A**	
Vancide-Z	4	U-EB-S-A**	
Tennam	5	U-EB-S-A**	
Zn O	6	U-EB-S-A**	
Zerlate-Bordeaux	4; 16-8	2	2

*Early blight.

**Early blight, Septoria, anthracnose

TABLE 60 — Control of Tomato Grey Leaf Spot in Florida (12).

Fungicide	Wgt./100 g	Control Rating	Yield Rating	Exper. Pref.
Dithane Z78	2 lbs.	3	1	2
Dithane D14 + ZnSO ₄	2 qts. + 3/4 lb.	4	4	4
Dithane D14 + MnSO ₄	2 qts + 1 lb.	2	3	3
Dithane M22	1 1/2 lbs.	1	2	1
CMZ Copper	6 lbs.	5 U	5	5

TABLE 61

Incidence of Botrytis Grey Mold and Rhizoctonia Ground Rot After 16 applications between February 2 and May 2, in Florida (10)

Material	Concentration in 100 gals.	Grey Mold 0-36*	Ground Rot No. Rotted Fruit
Check		10	30
Dithane D14 + Zn + CuSO ₄	2 qt. 3/4 + 3/4 lb.	23	62
Dithane D14 + Zn + FeSO ₄	" 3/8 + 5 oz.	20	38
Dithane D14 + FeSO ₄	" + 10 oz.	20	65
Dithane D14 + ZnSO ₄	" + 3/4 lb.	24	57
Dithane D14 + " + Phygon	" " + 3/4 lb.	9	32
Agriprep, then Manzate	200 ppm — 1 1/2 lb.	13	39
Fermate	4 lbs.	1	17
Phygon (dust)	1%	4	48
" (spr.)	1/2 lb.	2	36
"	3/4 lb.	3	29
Thylate	1 1/2 lb.	3	10
Tennam	2 qt.	tr	15
Vancide 51	2 qt.	0.0	19

*Most disease possible = 36.



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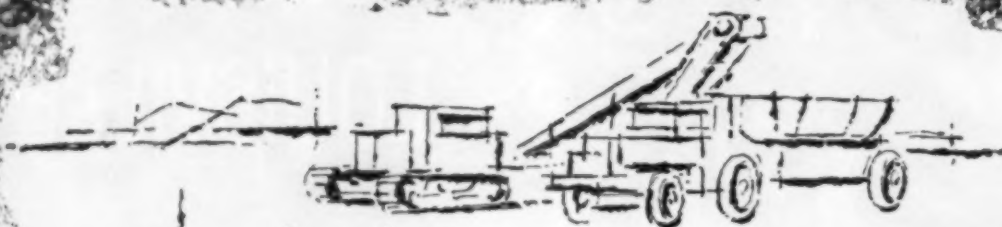
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TABLE 62
Disease Control and Yields of Watermelons in Florida From Eight Applications (14)

Fungicide	Rate/100 g	Disease Rating ^a			Yields in lbs./acre
		Anthr.	Cercosp.	Downy Mil. ^b	
maneb	1.5 lb.	1.9	1.4	7.9	36,250
zineb	2 lbs.	6.7	4.9	15.4	28,232
zineb + Cu-Mn-Zn mix ^c	1.5 lb., 1.6 lb.	8.3	11.5	37.1	27,464
nabam + Cu-Mn-Zn mix ^c	2 qt., 1.9 lb.	10.2	2.3	24.0	31,248
nabam + Zn.	2 qt., 1 lb.	15.4	3.2	43.1	29,748
Cu-Mn-Zn-mix	4 lbs.	25.2	8.3	47.5	28,292
Crag 658	2 lbs.	31.5	5.5	57.0	28,958
Tribasic CuSO ₄	3 lbs.	24.1	18.0	50.9	28,030
None		29.7	76.3	183.8	24,030
L-S-D 5%		17.8	7.4	39.0	5,118
1%		25.9	10.8	56.8	6,932

^aBased on disease intensity and area of infection. (400= complete defoliation.)

^bDowny mildew came late and ratings may reflect residual more than fungicidal effect.

^cThe Cu-Mn-Zn mixture contained 2.5 : 14 : and 14 lbs. of soluble salt.

TABLE 63
Control of Wirestem and Weeds in Cauliflower Seedbeds in New York (28)

Material	Rate	Control Ratings		Exper. Pref.	
		Wirestem	Weeds	Wirestem	Weeds
Vapam	1 qt./100 sq. ft.	2	2	1	1
MC 2	1 lb./100 sq. ft.	5	1	—	1
MC 2	3 lbs./100 sq. ft.	5	1	—	1
Nemagon 10%	340 lbs./A	5	2	—	—
Bedrench	1½ gals./100 sq. yds.	3	3	—	—
Mylone	90 lbs./A active	2	4	—	—
Terraclor 20	40 lbs./A active	2	3	2	—
Terraclor 75	15 lbs./A active	4	5	—	—
Terraclor 75	15 lbs./A active	1	3	1	—
	after seeding				
Calogreen	8 oz. in 50 gals. at 3.8 gals./100 sq. ft.	1	3	1	—

TABLE 64
Soil Treatments for Control of Stromatinia Dry Rot of *Gladiolus* in Washington State (58).

Material and Rate	Control Rating	Total Yield	Exper. Pref.
Tersan—350 lbs./acre-split appl.	1	3	1
Crag 974—150 lbs.	8	7	—
Crag 974—300 lbs.	4	2	3
Vapam—150 gals.	5	4	—
Vapam—125 gals.	3	4	—
Vapam—100 gals.	2	1	2
Vapam—75 gals.	6	5	—
Vapam—50 gals.	7	6	—

TABLE 65
Control of Root Knot on Muckland Parsnips in New York (28)

Fumigant	Gals./Acre	Control Rating	Yield Rating	Exper. Pref.
Dowfume W85	12	1 S	5	—
Dowfume W85	6	1 S	5	—
Dowfume W85	4½	1 S	2	1
DD	40	1 S	1	1
DD	30	1 S	4	—
Vapam	16=64 lbs. active	4 U	3	—
Control		6 U	—	—

TABLE 66
Root Knot Nematode Control on Muckland Head Lettuce in New York (27).

Fumigant	Rate	Root Scores ^a
Nemagon granular 10%	200 lbs./a	19
PRD granular 10%	80 lbs./a	21
Crag 974—85 WP	200 lbs./a	28
Control		29

^aPossible 60 if all were severe.

alternaria blight, and anthracnose, namely, Vancide M, Vancide Z and Tennam. Zinc oxide was too phytotoxic. These four were not thought worthy of further trial. Manzate and Dithane are recommended together with the regular Zerlate-Bordeaux program for grower use, but Dyrene has future possibilities. (Table 59.)

ANTHRACNOSE

In a comparison of Dithane Z-78 with Dithane M-22 conducted in irrigated and non-irrigated field plots by Crossan and Lloyd at Newark, Delaware, both materials gave satisfactory control under both conditions when ten weekly applications of spray were made. Both were safe and yields were equal. Manzate at two pounds controlled a little better than Dithane and so was preferred. (6)

GREY LEAF SPOT

In field plots sprayed sixteen times in as many weeks at Bradenton, Florida, Sowell obtained best control with Dithane M 22 at one and one half pounds and second best with Dithane + manganese sulfate although best yields came from Dithane Z 78 + Dithane M-22 respectively. All above are being recommended currently. The copper is not believed worthy of further testing. (Table 60.)

BOTRYTIS GREY MOLD AND RHIZOCTONIA GROUND ROT

In Florida replicated small plot tests by Cox and Hayslip have brought out the interesting fact that the use of Nabam, (Continued on Page 117)

TABLE 65
Sclerotiniase Control In Florida (11).

Chemical	Rate	Exper. Pref.
Terraclor 75%	30 lbs. in 200 gal. (2 appls.)	1
Terraclor 25%	100 gals. (1 appl.)	—
N-521	168 lbs.	—
Vapam	50 gal.	—
Allyl alcohol	50 gal.	—
Urea-formaldehyde	100 gal.	2
ferbam	20 lbs. in 200 gal. (2 appls.)	—

TABLE 67
Soil Fumigants For Nematodes And Soil Fungi Attacking Peanuts in Alabama (1).

Materials	Gal./Acre	Yield Rating	Exper. Pref.
Nemagon	35 lbs.	7	1
Dowfume 85	4.50	2	2
Fumazone	8.30	1	3
Fumazone	12.50	3	4
Dowfume 85	3.00	4	5
Dowfume 85	3.00	10	6
Telone	20.00	6	7
D.D.	20.00	8	8
Dorlone	12.25	9	9
S-1295	14.50	5	10

TABLE 68
Control of Rootknot in Tobacco Seedbeds at Los Banos, P. L. (67).

Treatment	Mean % Infected Plants	No. Galls per 100 Plants
Check	57	367
Chlorobromopropene	39	366
Formaldehyde	34	284
Methyl Bromide	10	32
Baked	5	16

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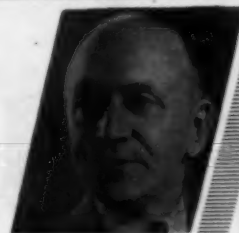
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Fertilizer Views and News

By Vincent Sanchelli



N. C. Study Confirms Experience

HOW good is the dairy cow in maintaining the fertility of a pasture? Is it more efficient to collect and spread cow manure by means of a good mechanical spreader or by means of the cow herself?

These two questions have been answered by studies at the North Carolina State College. Grazing cows do a poor job of fertilizing the pasture. Cows produce 76 pounds of manure per day on the average and of this amount about 56 pounds is solid and 20 pounds liquid. The liquid portion contains 1.1% nitrogen, 0.01% phosphoric anhydride (P_2O_5) and 1.15% potassium oxide (K_2O); the solid matter contains 0.38% nitrogen, 0.18% P_2O_5 and 0.22% K_2O . It is evident that the liquid contains about three times more total plant nutrients than the solid. Also, that the solid portion contains practically all of the phosphorus. Since a grazing animal deposits all of its manure at some points in the pasture it is assumed that the effect is beneficial to the forage plants. But, actually, only a small part of the total pasture area is covered — about 40% of the pasture is covered once or twice by one cow per acre in two years of continuous grazing. The application is not uniform. The study reveals that on the average after six years of continuous grazing with one cow per acre 20% of the pasture will not be covered at all, while about 16% will get four or more deposits. Furthermore, of the deposited manure about 40% of the nitrogen and 10% of the potash are lost by leaching each month. Eventually the fertility under each deposit is lowered to a level that is relatively deficient, which is to say, below 10

pounds of nitrogen and 20 pounds of K_2O per acre.

Farmers in the humid eastern United States have learned from experience that they could not depend on grazing cattle to maintain the proper fertility of their pastures. The North Carolina studies confirm this experience. It is necessary to replenish fertility by means of commercial plant food. Another profitable practice wherever feasible is to supplement the cow manure with superphosphate and spread it uniformly over the pasture with a distributor. Cows help some to fertilize the pasture but it is best apparently to include commercial fertilizer in the program.

Signs of the Times

SURELY the current heated discussion in the pharmaceutical trade whether or not to convert from the avoirdupois to the metric weight system is a sign of the times. A number of the leading houses, most purchasing agents for drug makers and the Bureau of Narcotics favor the change. Among those that have already made the change are these: Eli Lilly, Parke Davis, Wyeth, Merrell Sharpe and Dohme, according to *Chemical Week* (1/26/57). This switchover by some and not all factors in the industry has created, as would be expected, a chaotic situation. The die is cast, however, and the outlook is for a general change-over to the metric system.

Some of the hurdles in the switch to metric weights are formidable. Age-old customs are hard to change; manufacturers supplying pharmaceutical houses and other industries that don't use metric weights are forced to keep a dual accounting system; all

bills of lading and freight bills must be indicated in the old English system; scales and other measuring devices used in most chemical plants are now in the avoirdupois system and would have to be calibrated to the metric system.

A report from Delhi, India, dated January 24, 1957, indicates that India would switch from the English system of measurements to the metric system on April 1st, 1957. India also plans to have a decimal coinage. A period of 10 years will be needed in which the change is to be completed.

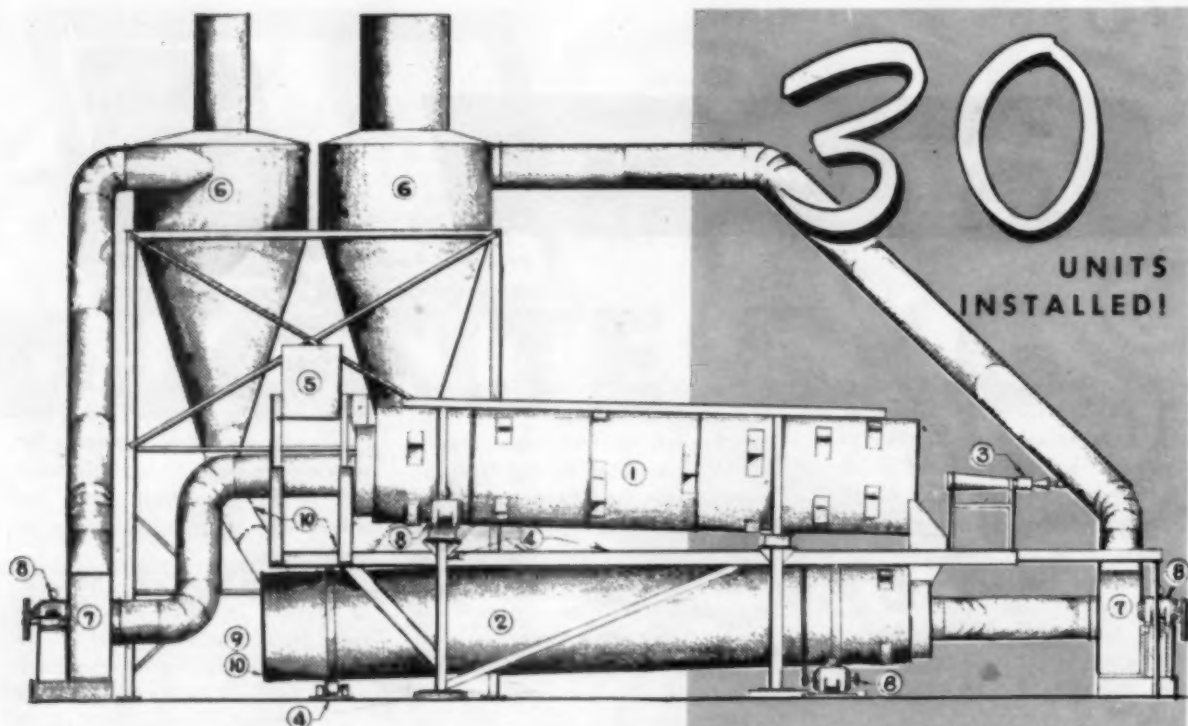
The Michigan State Grange this past January recommended to the Michigan authorities that they permit retail milk sales to be made in gallon and multiple gallon containers on the basis that it is good business to give customers what they want. Those who oppose this change claim that the gallon jug will wipe out profits now enjoyed by Michigan dairymen.

We referred some months ago to the switch from bushels to pounds in the small grain industry.

Are these events signs of the times? The fertilizer industry is in the midst of a heated debate regarding a change from the designations N, P_2O_5 , K_2O to N, P, K. The method of switching to the simple elements designation as proposed by the various scientific societies is orderly and slow and is designed to avoid the chaos in which the pharmaceutical industry now finds itself with respect to the metric-avoirdupois muddle.

Per Capita Plant Food Consumption

A COLLEAGUE in Taiwan (Formosa), Mr. Tah-ho Huang, forwarded data on plant food consumption in different countries based



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on the density of human population. He uses the term "per capita plant food consumption" and believes he has coined it. The term corresponds to the more usual basis, namely the "per unit area plant food consumption." Perhaps Mr. Huang may be the originator of this concept but I believe I have seen the concept used by Italian market research workers. However, regardless of origin, the new concept does have merit in correlating a country's plant nutrient consumption with (a) population density, (b) status of farming and characteristics of national diets and (c) with degree of industrialization. As he points out, the concept may be used as an index of the civilization of a country, the higher the per capita plant nutrient consumption the more advanced in modern civilization is that country.

To illustrate his point, he refers to 1953-54 plant nutrient consumption data published by the Food and Agriculture Organization of the U.N. Some of these data follow:

(Only a few countries will be cited from this tabulated data which are given in terms of kilograms of N , P_2O_5 and K_2O .)

The average per capita consumption of the three major plant nutrients (N, P_2O_5, K_2O) varies widely among the countries of the world, the lowest being that of India, the highest, New Zealand which exceeds 90 kilograms or about 198 lbs. per person. Most of the European and North American countries are on the high side; the Afro-Asian countries are on the low side.

Mr. Huang analyzed the relationship between plant food consumption per capita which he calls Y and that per unit area of cropland designated as X . The relationship between these two magnitudes is given by the equation $Y=0.383X$. Applying this equation to data given by the Organization for European Economic Cooperation (OECE) for the 17 countries comprising this group, he found that the average cropped area per capita is 0.383 hectare and each hectare supports an average of 2.61 persons.

Even this brief abstract of Mr. Huang's report shows, I believe, that there may be something to his contention that the per capita plant nutrient consumption of a country is an index of that country's modern civilization. Defining what is comprehended by the term "civilization" is something else and is not given in the original paper.

Weeds: Friends or Foes?

1. "Weeds are undesirable plants that interfere with agricultural operations, increase labor requirements, add to costs and reduce yields."

2. "But while men slept, his enemy came and sowed tares (weed seed) among the wheat."—Matthew 13:25. "As in biblical times the enemy is still with us. Competition of weeds with crops costs the U. S. farmer several billion dollars each year, or more than combined damage due to insects and plant diseases."

3. "Weeds—ragweeds, pigweeds, purslane and nettles—to men-

tion only four,—perform valuable services: they bring nutrient minerals, especially those which have been depleted, up from the subsoil to the topsoil and make them available to crops; break up hardpans, allowing crops in the rotation to feed deeply; they fiberize and condition soil, thus aiding soil organisms to perform more efficiently; store up minerals and nutrients that would otherwise be washed, blown or leached away from bare ground and keep them readily available, and they make good eating."

These three quotations have been gleaned from recent readings, "You pays your money and you takes your choice." Quotation No. 1 is from an interesting study of Jonas Vengris of the Massachusetts Agricultural Experiment Station. Vengris studied the competition between weed and cultural plants for mineral nutrients, light and moisture and concluded that weeds must be considered "robbers of our farms." Weeds can beat cultural plants for nitrogen, phosphorus and potassium and are thus able to reduce yields, especially when the supply of these nutrients is low. Some weeds are able to utilize forms of phosphorus that are relatively unavailable to cultural plants. Certain annual weeds, he continues, can accumulate as much calcium and magnesium as legumes and as large or larger amounts of potassium as the grains. He admits that, being rich in minerals, such weeds should make good livestock feed—"cows leave lush grass-legume pasture to go to the adjacent rundown grassland to get some "dessert," rich in minerals and vitamins.

Quotation No. 2 is a statement by M. W. Meadows in the *G. L. F. Week*, the newsy house organ of the latter organization. Mr. Meadows is definitely opposed to the spread of "noxious" weeds via cultural seed mixtures and advocates the destruction of all weeds by mechanical or chemical means.

The third quotation although not strictly verbatim does represent Mr. J. A. Cocannourer's attitude given in

(Continued on Page 125)

Country	1000 Metric Tons			Per Capita (N, P ₂ O ₅ , K ₂ O)	Pop. (1953) (Millions)
	N	P ₂ O ₅	K ₂ O		
France	295.5	587.9	450.5	31.3	42.74
Germany (Western)	440.0	447.2	829.9	34.9	49.28
Italy	209.0	396.1	37.7	13.6	47.14
Portugal	57.6	65.3	7.4	15.1	8.6
United Kingdom	246.7	354.7	256.4	17.05	50.37
Yugoslavia	18.5	17.0	19.0	3.21	17.0
Turkey	4.3	6.6	9.9	0.92	22.5
Brazil	14.5	12.5	23.5	0.90	55.8
Canada	46.1	105.0	76.9	15.0	15.2 (1954)
U. S. A.	1,776.0	2,131.0	1,624.0	34.2	162.2 (1954)
Australia	17.2	395.5	13.2	47.9	8.9
New Zealand	4.3	163.9	20.1	90.7	2.1
India	84.9	14.2	5.3	0.29	356.8

LISTENING POST

By Paul Miller



This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, United States Department of Agriculture, Beltsville, Maryland.

Chemical Control of Straighthead in Rice

N. S. EVATT, of the Rice Pasture Experiment Station at Beaumont, Texas, and J. G. Atkins, of the United States Department of Agriculture Agricultural Research Service, report* results of tests with several different chelated compounds and a soil amendment material for the control of straighthead, a non-parasitic disease of rice. The disease is characterized by sterile malformed florets and consequent erect panicles. Draining at proper times and planting of resistant varieties are the usual control measures. Iron compounds have been reported as correcting disorders of rice grown on muck soils in the Florida Everglades, apparently including straighthead, but no effective chemical control on mineral soils has been reported.

Data from an off-station field test in 1941 showed improved yields and less straighthead from the application of several minor elements to the soil on which the Blue Rose variety of rice was grown. One set of plots received 20 pounds of potassium permanganate, 20 pounds of boric acid, 50 pounds of ferric sulfate, 10 pounds of copper sulfate, and 20 pounds of zinc oxide per acre; together with 20-40-20 fertilizer. The other plots received only the 20-40-20 fertilizer. The plots receiving the minor elements yielded 17 barrels per acre, whereas those receiving only

the 20-40-20 fertilizer yielded only 12 barrels per acre. This statistically significant yield increase was attributed to less straighthead, but no further experiments were conducted at that time.

1956 Tests: Century Patna 231 rice was drill-seeded April 27, 1956, in an experimental test area on Hockley fine sandy loam near Eagle Lake, Texas. The area was kept flooded from 34 days after seeding until harvest. Soil and foliar application of the chelated materials were tested in plots 6 feet x 30 feet in complete randomized blocks with four replications. The materials were applied to the soil just prior to flooding at rates of 30, 75, or 120 gm. each of iron and zinc, and 20, 40, or 80 gm. of Versenol powder. Foliar treatments were applied at the rate of 1/2 gallon per plot at concentrations of 50, 100, 150, or 2000 ppm. of disodium Versenate before flooding, and 50, 150, or 300 ppm. iron, 20, 60, or 180 ppm. zinc, and 20, 60, or 80 ppm. manganese, 74 days after seeding. Each material was combined with a wetting agent in order to in-

sure even distribution.

The soil amendment material Feralum was tested in another experiment, using 0, 1000, or 2000 pounds per acre on plots in randomized blocks with four replications. The material was distributed uniformly by hand over the soil prior to flooding. Feralum, a chemical by-product, has the following composition: 29.86% ferric sulfate, 2.74% ferrous sulfate, 33.32% aluminum sulfate, 1.58% titanium sulfate, 10.76% free Sulfuric acid, 10.16% insolubles, and 11.58% water.

No observable effects of the chelates were noted. An estimated 75 per cent or more of the plants in all plots were affected by straighthead. No yields were recorded.

Highly significant yield differences were obtained in the Feralum test as shown in Table 2.

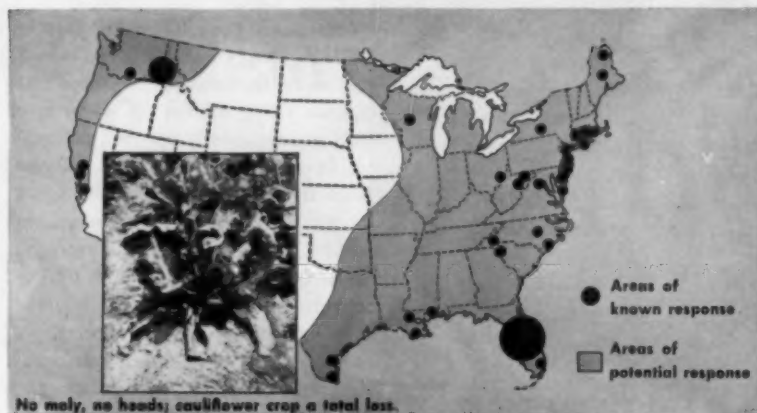
Visual differences between plots treated and not treated with Feralum were apparent. The percentage reduction in yield due to straighthead was estimated prior to harvest by a numerical rating scale of 1-5, inclusive. Each successive number comprised a 20 per cent range in reduction. A correlation coefficient of -0.99 between estimated percentage reduction in yields due to straighthead and actual yields shows that the estimates were very accurate. Had

TABLE 2.
Effect of Feralum on straighthead and yield of rice.

Treatment	Straighthead		Yield per acre*		Percent Increase
	(Class)	Pounds	Barrels		
None	5	1552	9.58		
Feralum, 1,000 lbs./A	3	2793	17.24		80
Feralum, 2000 lbs./A	2	3439	21.23		122
L.S.D.	.01	= 4.37 barrels per acre.			

*Evatt, N. S., and J. G. Atkins. Chemical control of straighthead in rice. *Plant Dis. Repr.* 41: 103-104. Feb. 1957.

*14 per cent moisture basis.



Can You Spot Crops Starved for Moly?

Recognizing moly-deficiency symptoms early enough to recommend moly applications can turn withering crops into healthy stands

At a technical meeting several years ago, someone asked a speaker where responses to molybdenum applications are most likely to be found. The speaker quickly answered, "On soils near an experiment station with a staff member who's familiar with moly-deficiency symptoms and who's testing for molybdenum responses."

This remark wasn't made entirely to provoke a laugh, notwithstanding the need for a little humor at technical confabs.

What the speaker was underscoring was that we didn't then have any idea how extensive the need for moly in the United States might be. There were relatively few agricultural people who knew much about moly, especially its effects in the field. Those few who did—naturally concentrated at places such as experiment stations—found soils that needed moly because they knew what they were looking for.

Dotting the Map

Now some years later, we have expanded our knowledge of moly's role in practical farming considerably. The once few pioneers working on moly at experiment stations are now many. They and other soil scientists at universities and research institutions, as well as farmers themselves, have dotted the map (see illustration) with locations of soils requiring moly for full productivity. At least thirty crops have been shown to respond to moly applications. Of these, ten are now being grown commercially in the United States with the aid of moly.

But, although we have come a long way with moly in just a few years, many growers are still getting marginal yields, or even losing crops, because they don't recognize the symptoms of moly starvation. They can see that something is wrong, but they don't know what. They either haven't heard, or can't

believe, that as little as a few ounces to a pound of moly per acre can mean the difference between skimpy, curled, twisted and scorched plants of little value and healthy crops of prime quality.

Key to Growth

Moly, while required in amounts considered minute even for a trace element, performs two essential functions in plants. It is needed for the fixation of atmospheric nitrogen by the bacteria in the root nodules of legume crops. It also is required in all crops, non-legumes as well as legumes, in the reduction of nitrates to nitrogen—the first step in protein synthesis.

Plants lacking sufficient moly show characteristic symptoms related to moly's key role in plant growth. Legumes have the well-known signs of nitrogen starvation. They are stunted, pale yellowish in color, low in protein content and hard to establish; fields are patchy. Non-legumes exhibit yellowish coloration in the leaves—chiefly in spots where nitrate accumulates between the veins and around the rim—and often the leaves are curled or cupped upwards, or otherwise distorted. Growth is poor and irregular, and the crop has an overall pale yellowish cast.

Some of these symptoms had been recognized as specific diseases—e.g., "whiptail" of cauliflower and "yellow spot" of citrus—for years before moly deficiency was discovered as the cause.

Following are more detailed descriptions of easily detected symptoms in common crops:

Beets. Plants may be stunted. Leaves narrow. Yellowing leaves make red veins stand out.

Cauliflower, broccoli. Whiptail. (See illustration.) Heads do not develop, or develop unevenly.

Cabbage. Yellowish mottling throughout leaf area between the veins. Head-

ing prevented by twisting and cupping.

Peas. Leaves turn yellow and become somewhat translucent. Dwarfing occurs. Vines weak and short.

Beans. Yellowish mottling sometimes called "scald". Flower and seed yield often greatly reduced.

Tomatoes. Curling and cupping of leaves. Formation of flowers and fruit reduced.

Celery. Tops turn pale green, then yellow.

Cantaloupe, cucumbers. Leaves are light green to yellow, develop edges which wither and curl. Stunting.

Differences in Soils

Crop response to moly application is often observed on soils of low pH, since under acid conditions moly is often tied up in a form unavailable to the plant. Liming, in making the soil more alkaline, releases moly to plants, and on some soils, this release of acid-bound moly may be the chief function of lime. In such cases, a few ounces of moly may be more effective and economical than several tons of lime.

Soils likely to be extremely low in moly are those that have been highly leached, such as coastal sands and hill country soils, soils that have been heavily cropped, and soils in areas of heavy rainfall. Conversely, highly productive, fertile soils, heavily limed or manured soils, and soils in regions of low rainfall are unlikely to produce visible deficiency symptoms, but increased yield and better quality may result from moly application.

In the United States, most reported responses to corrective treatment with moly are in the areas east of the Great Plains, and along the Gulf of Mexico, and in the Pacific Northwest. But until more testing is done, it is unwise to say categorically that crops grown in other areas won't respond to moly.

No Trick to Testing

Deficiency symptoms and soil types are good guides to the possible need for moly but they aren't infallible diagnostic aids. Systematic testing should always precede general application to the field.

It's easy to do:

The first step is to make up a stock solution by dissolving one ounce of sodium molybdate in one gallon of water.

With vegetable crops such as cauliflower, broccoli and beets, select and mark one or more rows in the center of the field. Diluting three cups of stock solution to one gallon of water, apply the moly to the test rows, at the rate of one quart per 250 feet of row. Compare treated and untreated rows every other day.

With legumes such as alfalfa and clover, lay out a test plot 10 yards square adjacent to an untreated area to be used as a control. Follow your usual fertilizer program, but use no nitrogen on either control or test plot. Spray the test plot with one cup of stock moly solution diluted to one gallon. Applications can be made at seeding time or to an established stand. Make regular observations, comparing thickness of stand, color and quality of growth.

For a one-ounce test sample, and further information on how to lay out test plots, address Dept. 43, Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.

the experimental area been drained at the recommended time, it is estimated that the acre yield would have been at least 24 barrels.

It is difficult to attribute the results with Feralum to any particular element. Superficial inference would place emphasis on iron nutrition, but heavy additions of sulfur and aluminum were also made. Also, a change

in the availability of an existing soil element or elements might have occurred. Applications of Feralum are not considered to be economically practical at present. However, the results of this preliminary test provide valuable leads for future work, since the compounds in this material can be applied separately by different methods and on different dates.



This column, reviewing current insect control programs, is a regular feature of **AGRICULTURAL CHEMICALS**. Mr. Dorward is head—Plant Pest Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward

Alfalfa Weevil Most Active of Forage Pests

THE alfalfa weevil, long established in the West, was first reported in the Eastern United States in 1952. It is now an agricultural pest in the South Carolina to New York region. By early May, the alfalfa weevil was causing damage in most of the eastern states where it is established. In South Carolina the weevil is now known to be in Florence, York and Newberry Counties; the heaviest damage was reported from York County. It continues to spread in North Carolina and during early May the first county west of the Blue Ridge Mountains in that state to become infested was reported. This was Alleghany which is in the northwestern part of the state. Untreated fields from Granville county west to Stokes county averaged one larva and 3 to 9 newly emerged adults per sweep.

The alfalfa weevil was the outstanding insect problem in Virginia during early May, with damage being heavy in most counties where controls were not applied. Larval populations reached a peak in central Maryland and damage was heavy in unsprayed alfalfa fields. During late April almost total losses of first-growth alfalfa were reported from several places near Bridgeville, Delaware. Damage was reported as moderately heavy in New Castle County, to severe in most of Kent and Sussex

Counties in fields where controls were not applied. By early May alfalfa weevil eggs were plentiful in stems of alfalfa in Pennsylvania and larvae and adults were easily collected in the south central area of the State.

In some of the western states the alfalfa weevil was also very active. Populations as high as 5 adults per sweep were reported from Vale and Ontario, Ore. No hatching had been noted by the first of May. Surveys showed the insect to be common in all the major alfalfa-growing areas in the southern part of the State.

The pea aphid which caused severe damage to alfalfa in 1956 is active over a wide range, but apparently populations, in general, are lower than last year. In Virginia, populations were high in both alfalfa and clover fields, with controls necessary in some instances. Other eastern states had mostly light to moderate populations, with numbers beginning to build up in early May.

The heaviest pea aphid populations in Illinois were in the southwestern section of the state. Heavy infestation and damage was reported from Livingston and Grundy Counties, Mo. In early May populations remained high on alfalfa and crimson clover in Tensas and Bossier Parishes, Louisiana. In Oklahoma the pest was beginning to build up rapidly.

European Corn Borer Survival

THE European corn borer, which in 1956 caused an estimated loss of over 119½ million dollars in field corn, has apparently survived the winter in sufficient numbers in various areas to develop potential damaging infestations. In Minnesota, mortality for the overwintering larvae averaged 18 percent as compared with 23 percent in 1956. The number of larvae surviving in that state, particularly in the southwest and central districts, is sufficient to develop into damaging populations under favorable conditions.

In the southeastern part of South Dakota overwintering survival averaged 85 percent, but fortunately the number of larvae entering hibernation was very light. Counties reporting survival counts in North Dakota listed a range of 80 to 85 percent. Iowa reports an average count of 2,972 borers per acre in 32 Boone county fields. This is only 14 percent of the populations present in the fall of 1956. The potential is less than 1954 or 1955, but greater than any other year since 1951. With favorable weather conditions, corn borer damage in Iowa could be greater than 1956 but would not be expected to reach that of 1954. European corn borer survival in the central area of Illinois averaged 77 percent, while the average in the north central area was 72 percent. Survival of nearly 80 percent of the overwintering larvae was recorded in Jefferson and Dane counties, Wisc.

Overwintering European corn borer larvae were found to be exceptionally abundant in old corn stalks in the Hudson Valley of New York. The borer is expected to be a major pest of early corn in New York this spring. By the latter part of April adults were abundant in Delaware and emergence was about half complete in North Carolina.

Other Insect Activity

BY early May, English grain aphid populations in Kansas were present in all wheat and barley fields surveyed. Counts ranged from 4 to 300 per 25 sweeps which were the highest in the past four years. The

(Continued on Page 93)

Problem:



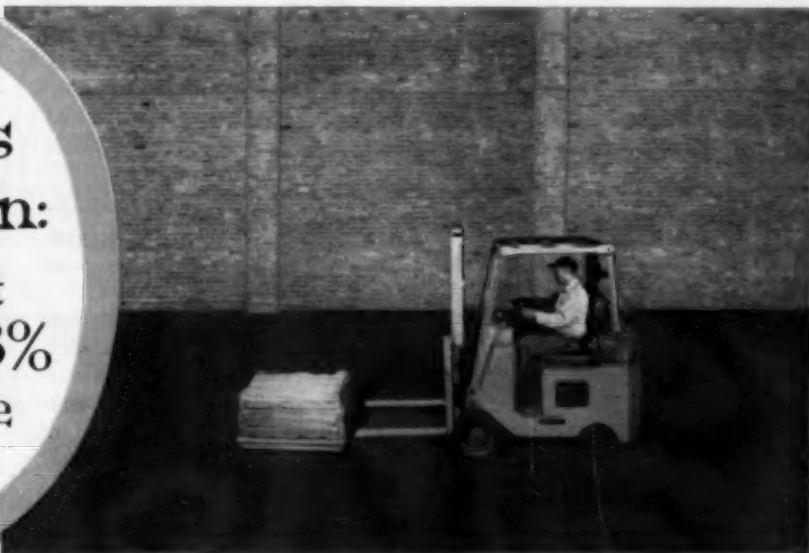
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TECHNICAL SECTION



Effect of Various Fungicides Applied During Bloom On Apple Pollination and Fruit Set*

By Avery E. Rich**

APPPLICATION of a fungicide during bloom is frequently necessary in the Northeast for control of apple scab, but little information is available concerning which materials are safe to use on trees in bloom. In fact, most of the research has been done with compounds such as Elgetol and other dinitro compounds in an attempt to reduce pollination and fruit set. Therefore, it seems desirable to determine which non-poisonous, mild fungicides can be used safely during the bloom period without endangering a reduction in fruit set.

Apple buds were forced into bloom in the New Hampshire Agricultural Experiment Station greenhouses during the late winter as well as the early spring months of 1955. Pollen was collected and germinated in various concentrations of sucrose solution to determine a suitable strength of sucrose solution to use. Double depression slides were used for conducting the tests.

Captan, glyodin, ferbam, dichlone and sulfur were added to the sucrose solutions at the rate of 2 pounds, 1½ quarts, 1½ pounds, ½ pound, and 6 pounds, respectively. (The rates refer to the materials as usually marketed, not 100 per cent technical grade.) When pollen was added to these fungicide-containing solutions, it germinated very poorly, if at all, except in the one containing sulfur. Therefore, the concentra-

tion of the fungicides was reduced to 50 per cent and then to 25 per cent of the above rates, but still practically none of the pollen germinated except that which was in either a plain sucrose solution or a sucrose solution to which sulfur had been added. In some cases many of the pollen grains burst. This was very common when ferbam was added. When the fungicide concentration was finally reduced to 12½ per cent of the original or "field strength" rate, pollen germination was somewhat improved. (Table 1.) From these data one might assume that sulfur is the only fungicide which would be safe to use during the bloom period.

In an attempt to more closely simulate field conditions, apple blossoms were sprayed with the same fungicides used above. When they were dry, pollen was collected from each treatment and placed in an 8 per cent solution of sucrose, to test its germinability. Under these conditions none of the fungicides appeared to seriously inhibit pollen germination.

Then blossoms were sprayed with

these fungicides at field strength in three orchards, under different climatic conditions. In one orchard pollen was used from a sprayed Hyslop Crab to pollinate unsprayed McIntosh flowers. In the other two orchards unsprayed Cortland pollen was used to pollinate McIntosh blossoms sprayed with these fungicides. Blossoms used in the tests were screened to prevent natural pollination. Pollen from all three orchards was collected for germination tests in the laboratory. The results show that none of the fungicides tested seriously affected either pollen germination (Table 2) or fruit set (Table 3). It is assumed then that they did not injure either the male or female parts of the flowers.

As dichlone discolors the petals, there has been a tendency to avoid its use in bloom for fear that it might also injure the other flower parts. Spray calendars have also warned against the use of ferbam in bloom. This may be a result of observations that pollen grains burst when immersed in a ferbam spray.

The conclusions which can be drawn from these studies appear to be as follows: (1) the method of immersing pollen grains in fungicide

TABLE 1
Pollen Germination in Sucrose Solutions Containing Fungicides at Full, ½, ¼ and ⅛ Suggested Concentrations

Treatment	Concentration*	Full	Concentration		
			½	¼	⅛
		Per Cent Germination			
6 pounds	Sulfur	37	50	34	41
2 pounds	Captan	0	0	4	2
1½ quarts	Glyodin	0	3	1	12
½ pound	Dichlone	0	0	6	11
1½ pounds	Ferbam	0	0	0	1
	Check	51	51	41	37

*Rate per 100 gallons at full strength.

*Based on research work done at the New Hampshire Agricultural Experiment Station, and published as Research Mimeograph No. 3, Botany.

**Plant pathologist, New Hampshire Agricultural Experiment Station. The writer wishes to acknowledge the assistance of Mr. James D. Billbruck, formerly research assistant.

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solutions or suspensions is too severe for use in determining which fungicides are safe to use in bloom; and (2) captan, dichlone, ferbam, glyodin and sulfur do not seriously reduce pollen germination or fruit set when applied to apple trees in bloom. This information was very valuable in 1956, when a spring frost damaged orchards, and fruit growers did not want to take any chances on a further reduction in fruit set.★★

Identify Mite As Carrier

The wheat curl mite has been identified as probably the only carrier of wheat streak-mosaic virus in the Great Plains region, the U.S. Department of Agriculture reports. The identification climaxed a three-year search for insects and mites that could spread the highly destructive virus.

Wheat streak-mosaic has been especially destructive to winter wheat in western Kansas and has caused severe damage in Nebraska, Colorado, and South Dakota. The disease has wiped out entire wheat crops in some areas. The virus invades and grows within the wheat plant, causing plant leaves to become streaked, spotted, or mottled with yellow.

Combination Mildew Spray

Tests by horticulturalists at agricultural experiment stations indicate that a combination of fungicide sprays gives apple growers a powerful weapon against mildew. Virginia and Maryland spray guides recommend use of a spray containing sulfur and Crag Glyodin for mildew protection.

Sulfur is an effective control for mildew, but it has a tendency to burn foliage and russet fruit, especially during hot weather. When used with Crag Glyodin, a product of Carbide and Carbon Chemicals Co., New York, the sulfur dosage can be reduced by half because it is spread evenly and still does an efficient job.

Plant Parasite In Carolina

Witchweed, a new parasitic plant that attacks corn, sugarcane, sorghum, and other plants, has recently been found in the Carolinas—

TABLE 2
Germination in 8 per cent Sucrose Solutions of Pollen Sprayed
in Bloom with Various Fungicides

Fungicide	Concentration	South	Location Collected		Average*
			Central	North	
			Per cent Germination		
Sulfur	5 pounds	35	38	40	38
Captan	2 pounds	24	28	40	31
Glyodin	1 quart	11	46	43	33
Dichlone	¼ pound	31	37	37	34
Ferbam	1½ pounds	20	47	54	40
Check		38	47	58	48

*Tests were run at three locations in the state and the results were averaged.

TABLE 3
Effect of Various Fungicides applied in Bloom on Fruit
Set in 3 Locations in the State

Fungicide	Concentration	South*	Location		North**
			Central**		
			Per cent Fruit Set		
Sulfur	5 pounds	36	40		12
Captan	2 pounds	41	39		14
Glyodin	1 quart	33	39		14
Dichlone	¼ pound	40	41		11
Ferbam	1½ pounds	28	39		8
Check***		23	34		12

*Unsprayed blossoms hand pollinated with sprayed pollen.

**Sprayed blossoms hand pollinated with unsprayed pollen.

***Natural pollination.

the first time it had been recognized in the Western Hemisphere.

The weed is described in a booklet prepared by the U.S.D.A. Agricultural Research Service in cooperation with North Carolina State college and Clemson Agricultural college. The booklet, PA-331, is illustrated and contains a description of the parasite and its effect on the host plant.

2 New Davison Fertilizers

Two new fertilizer products for farm use, both of water soluble characteristics, have been announced by Davison Chemical Co., Division of W. R. Grace & Co., Baltimore, Md.

Dav-Gro is a high analysis water soluble plant food, with the formula 20-20-20 and also carries the essential minor elements and minerals. It provides instant feeding for vegetables, citrus and fruit trees, truck gardens and field crops.

Start-Rite bears the 10-52-8 formula recommended to promote healthy early growth with vigorous root systems that ensure high quality yields.

Codling Moth Control Study

New materials for codling moth control were tested during the 1956 season by the College of Agriculture of the University of California, Berkeley, because of reports of codling moth resistance to DDT, although none of the cases occurred in California.

The materials tested were Trithion, Diazinon, a combination of DDT and Diazinon and, as a comparison, a combination of DDT and parathion. Tests were conducted in a Bartlett pear orchard.

The two phosphates—Diazinon and Trithion—as well as the DDT-Diazinon combination did not give adequate commercial control. Over 7 percent infested fruit was found in these three plots. The parathion-DDT combination gave better results, showing a little more than two percent worms. Trithion was found to have a phytotoxic effect on pears, causing irregular russet spots on the sides of the fruit. Although the damage was shallow it would be a factor with fresh shipped fruit.

BIG THINGS are happening in Garfield, Utah...home of Western Phosphates, Inc., makers of Anchor Brand Fertilizers!

Over \$5,000,000 were invested in the plant initially just four years ago. Today millions more are being spent there to answer the West's demand for greater output of quality Anchor fertilizers. Expansion and diversification are the rule at Garfield, not the exception.

By using Western Phosphate Fertilizers, your customers are assured of consistent quality ... results that are always in their favor.

ANCHOR BRAND TREBLE SUPERPHOSPHATE AMMONIATION GRADE

Ammoniation Grade is engineered for greater nitrogen absorption ... high free-acid content ... high moisture content.

ANCHOR BRAND TREBLE SUPERPHOSPHATE PELLETED GRADE

Pelleted Grade gives high total, high available, high water-soluble phosphoric acid.

ANCHOR BRAND PHOSPHORIC ACID

Top quality. Suitable for soil or water application or for manufacturing complete fertilizers.

ANCHOR BRAND 11-48-0

All guaranteed nitrogen and phosphoric acid is water-soluble. Uniformly pelletized for even distribution. Meets high-phosphate requirements.

ANCHOR BRAND 16-20-0

Ideal for application where all nitrogen and phosphorus requirements can be applied at one time. Uniformly pelletized. All guaranteed nitrogen and phosphoric acid is water-soluble.

ANCHOR BRAND 13-39-0

Each pellet contains balanced amounts of nitrogen, phosphorus, and sulphur. Ideal for crops requiring the popular 1-to-3 ratio. All guaranteed nitrogen and phosphoric acid is water-soluble.



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Seven years of operation on prove the **KENNEDY AIR** **Answers the demand for LOWER**

Over the past seven years three of the most prominent producers of fertilizer from Florida Phosphate Rock have installed Kennedy Air Swept Grinding Systems for reduction of pebble, concentrate and combinations of both.

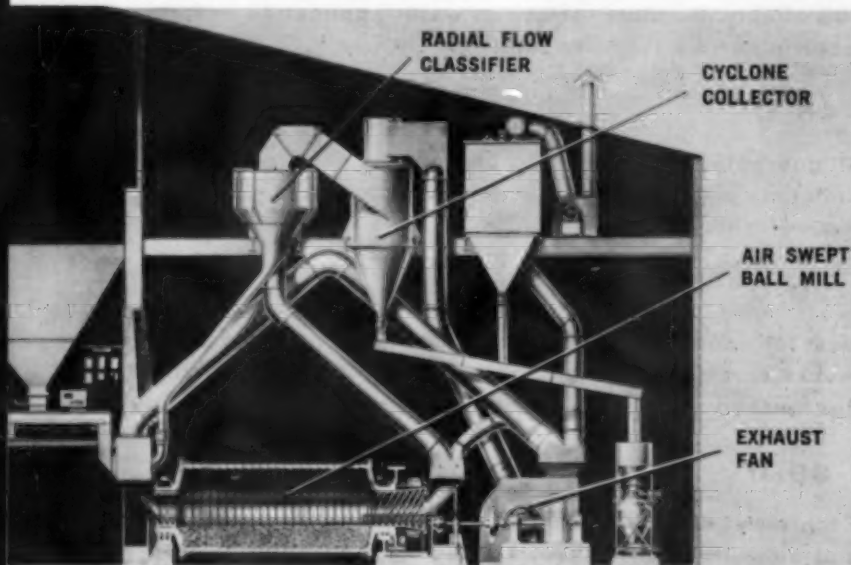
THEIR EXPERIENCE HAS PROVEN THAT THE SAVINGS IN MAINTENANCE AND POWER ALONE AMORTIZE CAPITAL INVESTMENT WITHIN A FEW YEARS!

The reduction of grinding costs is vital to the Phosphate industry and, in the grinding of more abrasive

materials, the ball mill has long been accepted as the only type pulverizer for continuous high production operation and lowest maintenance.

With steadily rising costs for operating and maintenance personnel as well as higher cost building space and structural work, the need for more efficient machinery becomes a "must." Decreased grinding costs mean an improved competitive position and larger profits.

THE KENNEDY AIR SWEPT BALL MILL GRINDING SYSTEM IS THE ULTIMATE IN HIGH PRODUCTION AND LOW COST OPERATION.



THE KENNEDY AIR SWEPT BALL MILL, ENGINEERED FOR THE PHOSPHATE INDUSTRY.

Kennedy Radial Flow Classifier is adjustable while system is in operation . . . wide range of product sizes . . . high degree of accuracy. No internal moving parts . . . all points of high velocity protected by wear-resistant materials.

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KENNEDY-VAN SAUN

Florida Phosphates SWEPT GRINDING SYSTEM PRODUCTION COSTS!

OUTSTANDING FEATURES

- **Lower Maintenance**

Tramp iron, manganese, and other foreign material cannot damage system. *No magnetic separation required.*

- **Continuity of Operation**

Grinding balls added while mill is in operation, maintaining constant level of grinding media. Production and fineness remain constant, month after month. No periodic shut-down for lubrication or replacement of wearing parts. Years of operation assured before parts (other than grinding balls) require replacement.

- **Minimum Power**

- **Lower Operating Costs**

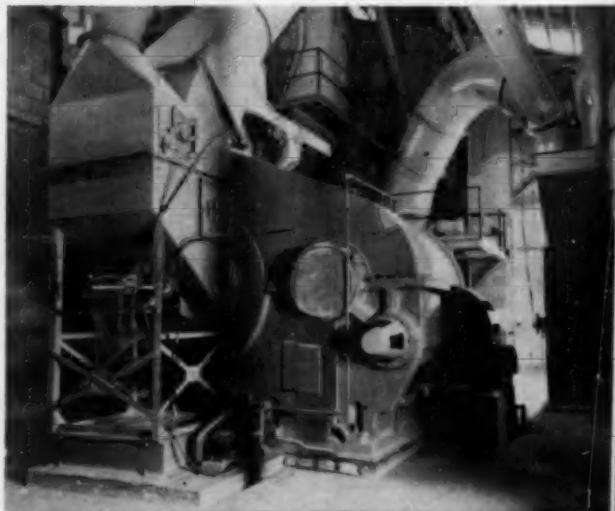
Dependability of equipment and reliable automatic feed control assure high production with minimum operating personnel.

- **Higher Production**

Single grinding unit capacities to 75 tons per hour, requiring less floor space and structural work per ton of production.

- **Flexibility of Design**

Kennedy-Van Saun Air Swept Ball Mill Grinding Systems available in a wide range of capacities to meet your requirements.



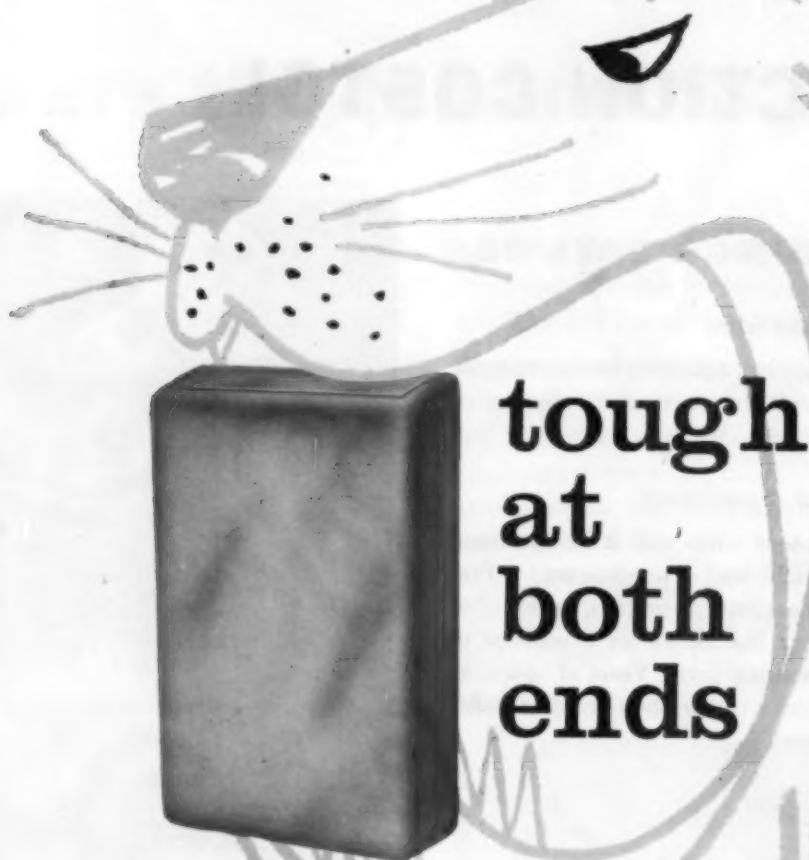
Kennedy-Van Saun 10' x 15' Integral Gear Drive Air Swept Ball Tube Mill and #93 Exhauster Fan.



Kennedy-Van Saun 60'' Enclosed Disc Feeder

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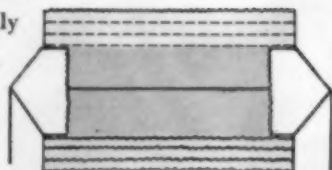
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That's Hudson's new PLY-WELD . . . the
latest improvement in stepped end
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breaking . . . handles more easily
at the spout, speeds production.

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Fertilizer Screens and Screening

A DETERMINATION of the quantity of fines or oversize is obtained by sieve analysis of the final product. In actual fertilizer production, oversize is separated from the final product and sent through the crusher, while fines are returned through the granulator. Selection of screen sizes, therefore, for these separations, is an important step in plant operation.

A laboratory screen analysis gives a complete analysis of particle size distribution of the product, and offers a means of determining particle size range for separation.

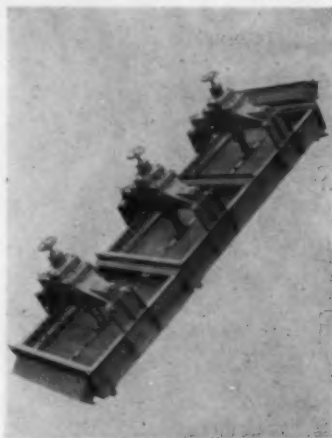
After determining the range of granular distribution desired, it is suggested (1) a sieve be selected which determines the point of separation for the top size and for fines removal, (2) one sieve selected directly preceding or coarser than the sieve selected, and (3) one sieve on the next finer size position; in addition, at least one intermediate sieve should be included in the series.

Chart 1 gives the entire picture on extent of granulation, from the point of view of particle size measurement. Particles retained on each sieve are shown in vertical bars to indicate percentage of depth of each bar. The chart aids determination of the economical top size point of separation. The desired point of separation for removal of fines may also be determined by the same procedure.

The rejected top size is in closed circuit through a crusher, and this

closed circuit is effected by return through the ammoniator, the dryer, the cooler or direct to classifier screen. The fines recycle is returned through the ammoniator. The sieve analysis shows granulation efficiency and should be taken as frequently as required, i.e., depending upon processing problems, where the granulation efficiency could vary considerably, especially between grades.

By W. King, W. S. Tyler Co., at the Fertilizer Industry Round Table, Wash., D. C.



Vegadex On Florida Celery

Celery growers in the Florida Everglades produce more than one-half of the nation's winter celery crop on 11,000 acres of the more than 300,000 acres of rich muck land reclaimed for farming purposes from the Everglades in the past 25 years.

Machine cultivating, however, has proved impractical because of damage to the tender stalks. With as many as four weedings required

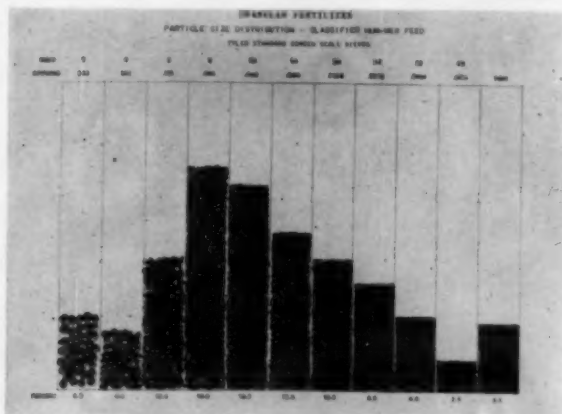


Chart I—
Particle size
distribution—
Classifier
Hummer Feed

before harvest, and hand weeding the most practical method of accomplishing this, weed care has been costing up to \$50 an acre.

Last year, at the A. J. Sullivan farm near Belle Glade, Vegadex was tried on a large scale basis and was reported to have given "excellent weed control." A product of Monsanto Chemical Co., St. Louis, Mo., Vegadex was credited with eliminating between 80 and 90 per cent of the hand hoeing that would ordinarily be called for, representing a saving of around \$20,000 on weed control. In some of the tests, Vegadex-treated plots turned out as many as 50 more crates of celery to the acre and there was no evidence that Vegadex in any way reduced yield.

An illustrated report of the tests is contained in the March-April issue of "Monsanto" Magazine.

N. J. Tests Trace Elements

Agricultural research specialists in New Jersey have been among the first to undertake the study of the need for minor—or trace elements—in the soil. Some rather definite need has been found under some New Jersey conditions for boron, manganese, iron, and molybdenum.

Apples and peaches, particularly in such areas as Gloucester, Camden, and Atlantic counties, have shown response to zinc treatments. The need for copper, however, has been demonstrated only for certain vegetables on the muck soils. The progress of these tests has been reported by Norman F. Childers, chairman of the horticulture department, Rutgers University, New Brunswick, in the March issue of *New Jersey Farm and Garden* magazine.

For the most part, Rutgers workers have investigated but one of the six important trace elements at a time to try to pin down deficiency characteristics for a wide variety of plants, also to determine the need for the nutrient, if any, in the many New Jersey soil types. Encouraging progress was reported on tests conducted on 75 South Jersey farms in 1956. In one case, addition of minor elements increased per acre yield of sweet potatoes 58 bushels.

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WASHINGTON REPORT

By Donald Lerch



ORGANIC gardeners are at it again! Washington feels that most of the criticism directed at the gypsy moth campaign in the Northeast is coming from small, but well-organized, groups of organic gardeners.

When representatives of the organic gardening group testified before Congress during the Delaney investigations, their views were sharply challenged by recognized scientists from agricultural colleges and experiment stations throughout the nation. However, the organic gardeners are still firmly opposed to the use of chemicals, and take every possible opportunity to oppose major pest control programs. Their opposition to the gypsy moth program in the Northeast follows their stand against the Med fly program in Florida.

Despite the prominent fashion in which the New York city papers have attacked the gypsy moth control program, however, very few complaints are being received by the USDA officials in charge. This is in contrast to a deluge of complaints received by some state officials.

A check at the Newburgh New York office, headquarters for the spray operation, shows that actually fewer complaints are being received than for any comparable sized control program. Consequently, it would seem that either people don't read their newspapers, or they are highly selective in how they react to such scare stories. Furthermore, it might indicate that some of the educational programs of the pesticide industry are reaching the general public with facts about the importance and proper use of pesticides.

USDA officials did have their hands full, however, with problems

in getting spraying completed on schedule. One of the major spray contractors was reported to be far behind on its substantial portion of the job because of delay in getting its planes approved by CAA. It was uncertain late in May whether the job could be completed by June 15-20, the scheduled cut-off date.

* * * * *

Slightly more money is available from the Federal government this year for grasshopper control, provided matching funds are available from local sources. The U. S. Department of Agriculture has what it considers "adequate funds," slightly over a million dollars, available for grasshopper control, providing two-thirds more comes from local sources.

Washington is speculating on the effect of added moisture on the grasshopper control program. Some ranchers may take the view that added rainfall means they'll be able to produce enough grass for cattle and the grasshoppers too. What's more, grasshoppers generally seem to be doing more damage when they're feeding during a drought, since the reduced grass cover means you can see them better. However, after discounting these factors, it looks as though there will be definite local interest in controlling grasshoppers again this year.

* * * * *

A couple of new Med. fly infestations are showing up outside the areas previously sprayed. However this was expected by control authorities, and thus far these new outbreaks have been "spotty." Encouraging note is that no new flies are showing up in the areas where general control operations have been carried out.

* * * * *

The June meeting of the National Plant Food Institute may come to be regarded as one of the most significant sessions ever held. Overshadowing all other phases of the convention is the subject of fertilizer marketing.

Major decision is how well the fertilizer industry can work together to increase fertilizer sales to farmers. Coupled with this is the cold reality of how much of the industry's resources will be allocated to the marketing job on an industry-wide basis.

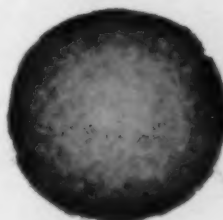
Premise for industry's progressive step in the marketing field is the solid factual evidence on the shelves of nearly every agricultural experiment station of the country that most farmers could make more profit by using more fertilizer. In most cases the generalization is made that farmers are using only about half as much fertilizer as they could profitably use.

Without question, the agricultural extension service and the county agent system are the backbone of agricultural progress throughout the country—the important means of disseminating information to farmers. However, there is serious question of whether the system is able to bear up under the increasing load placed upon it by the explosiveness of progress in agricultural technology.

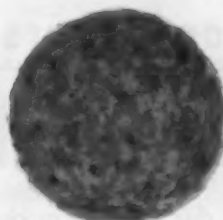
Witness Missouri with its "balanced farming program" and Michigan with its "township agent program." In both these cases farmers cooperating with the programs have access to the personalized services of an agricultural specialist. Groups of from fifty to one hundred farmers look to the specialist for detailed planning information and more frequent help and advice than is available

(Continued on Page 111)

MAGCOBAR DOES A SLOW BURN TO MAKE CARRICLAY



Short run and intense heat cause clays to form a hard-baked crust around a soft center.



Magcobar's longer run at lower temperature bakes each particle all the way through for a more uniform product.



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Real speed and accuracy...

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How would you like *this kind of* money-saving speed and accuracy? In actual plant operation, the Bemis FERTILIZER PACKER is filling and closing sixteen to eighteen 80-lb. bags per minute... and holding consistently to a weight tolerance of plus or minus 4 oz.

**And now...
Bemis JETROL injector...**



The new, better way to add liquid insecticides to fertilizer.

JETROL, a Bemis-designed attachment for the new Bemis FERTILIZER PACKER, automatically sprays liquid insecticide *through* your fertilizer as it falls into the bag. JETROL measures exactly, diffuses thoroughly and minimizes toxic problems. You'll like its dependable performance.

Here are the pay-off features:

- Improved feeder design to insure maximum accuracy at higher speeds.
- Bemis-designed automatic sewing machine actuator and cutoff.
- Vee-Trof or Vee-Slat Conveyor optional... keeps bag upright unassisted.
- Stainless steel product-contact surfaces and functional parts with corrosion-resistant paint used throughout.
- One- or two-man operation.
- Size range: 50-, 80-, 100-lb. multiwall bags; 100-, 200-lb. textile bags.

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AGRICULTURAL CHEMICALS

NEWS about the TRADE



Frontier Product Manager

John B. Childress has been appointed by the Frontier Chemical Co., Wichita, Kans., to the post of product manager for industrial chemicals. He assumes charge of marketing, technical service, and promotion for Frontier basic chemicals used in industry, including chlorine, caustic soda, muriatic acid, chlorinated solvents, and other products.



NAC Spring Meeting In N. J.

The National Agricultural Chemicals Assn., Washington, D. C., will hold its annual meeting in the Essex and Sussex, Spring Lake, N. J., on Sept. 4, 5, and 6. John A. Rodda, manager, Fairfield Chemical Division, Food Machinery and Chemical Corp., New York, is program chairman for the meeting.

Pacific ESA Meets June 26

Dr. Horace Telford, head of Entomology, Washington State College, Pullman, Wash., is the program chairman for the Entomological Society of America's Pacific Slope Branch convention in Portland, Ore., June 26 to 28.

Among the speakers at the meeting will be Dr. Roy Hansberry, Shell Development Co., Modesto, Calif., who will discuss research in Europe.

Resume Production At Nitro

Production of "Nitran," Monsanto Chemical Co.'s ethyl parathion insecticide, was resumed on May 22 at the company's Nitro, W. Va., plant, five weeks after the April 16 explosion there which cost eight lives, halted output of this product, and destroyed facilities for methyl parathion, a related compound.

Facilities to produce both Niran and methyl parathion are being constructed at Monsanto's Anniston, Ala., plant. The area formerly occupied by the methyl parathion unit at Nitro will be put to other plant use.

Ammonia Plants In Mexico

Fabricated Metals, Inc., San Leandro, Calif., has been awarded a contract to build four liquid fertilizer plants in Mexico. The plants will manufacture aqua ammonia.

These will be the first such plants in Mexico. They will be erected in the northwestern part of the country to serve Lower California, Sonora, and Sinaloa.

Lift All Florida Medfly Bans

With the lifting on May 21 of the Mediterranean fruit fly quarantine regulations in the last remaining regulated portions of Dade and Lee Counties, Fla., the U. S. Department of Agriculture and State of Florida have completed, after a single year's campaign, the eradication of this fruit and vegetable pest in all federally regulated counties in the state.

The initial quarantine was put into effect on May 16, 1956.

Crag Moves To White Plains

Crag Agricultural Chemicals has moved its sales headquarters from New York City to new suburban offices in near-by White Plains, N. Y. Included in the move are the Technical development group, part of the Crag Agricultural Chemicals Department, Union Carbide Chemicals Co., Division of Union Carbide Corp., New York.

Arnold Heads New O-M Corp.



Henry A. Arnold has been named president of the newly formed Olin Mathieson International Corp., a wholly owned subsidiary of Olin Mathieson Chemical Corp., New York.

Mr. Arnold is responsible for all of Olin Mathieson's overseas activities which include the production and marketing of Mathieson industrial and agricultural chemicals, Squibb medicinals and pharmaceuticals, Winchester sporting arms and ammunition, non-ferrous metals, and cellophane and paper packaging products.

Before his appointment as president of the new international corporation, Mr. Arnold had been vice president of Olin Mathieson in charge of its South American operations and was also president and managing director of E. R. Squibb & Sons Argentina, S. A.

Thompson Ends Insecticide Prod.

Thompson Chemicals Corporation, St. Louis and Los Angeles, manufacturers of agricultural and industrial chemicals for over 25 years announce that they have decided to withdraw entirely from the production and distribution of the present known agricultural insecticides.

Announcement of the firm's withdrawal from the field of broad spectrum insecticides was made by Mr. Wm. T. Thompson, president of Thompson Chemicals Corporation, in the following statement:

"A 12-year study has convinced us that the currently known and used broad spectrum insecticides are at best palliative and may prove dangerous in the long run.

"The growing number of insect pests becoming resistant to presently used insecticides demonstrates a serious inherent danger in their widescale use. The imbalance of the fauna population caused by the destruction of natural predators and parasites (thus allowing uninhibited development of the insect pest) can easily cause heretofore unimportant insects to increase to the status of economic pests.

"The ingestion of presently employed insecticide residues by humans and other warm-blooded animals is a correlative problem of a highly serious nature. The industrial hazards inherent in the use of chemicals of such highly toxic nature is also cause for great concern.

"Our study convinces us that any sound approach to the control of agricultural pests must be sought in chemical mechanisms that are selective between the insect pest and the beneficial insects. The study of physiologically and ecologically selective mechanisms must be the primary concern of research.

"Our future research in the field of insect control of agricultural pests will be in the exploration of selective insecticide chemicals. It is our hope that we may be able to make some worthwhile contributions to the agricultural control of insect pests and subsequent yield increases of a more permanent nature.

"Our current production will be devoted to a comprehensive line of agricultural and industrial chemical specialties in which we are admirably qualified."

Thompson Chemicals Corporation will continue its activities in the production and distribution of selective and general brush and weed killers, crop dessicants, penta products, plant hormones, plant growth regulators, livestock insecticides, small package home and garden chemicals, emulsifiers, and other chemical products for industry and agriculture.

Cattle Tick Program In Fla.

Cattle Fever ticks, found recently in Florida for the first time since the state was declared free of the pests in 1950, are targets of a federal-state eradication program now under way.

Cooperating in the program are the Florida Livestock Board and the

USDA's Agricultural Research Service.

In all, more than 100 ranches in ten Florida counties have been quarantined. Premises under the state quarantine include those to which cattle have been moved from ranches where ticks were discovered, and also premises that had supplied cattle to ranches known to be infested. Counties involved are Palm Beach, Hendry, Broward, St. Lucie, Glades, Highlands, Martin, Taylor, Dade.

Road Pest Control Discussed

The gathering and dissemination of significant data on pest control as applied to highway maintenance was discussed during the recent meeting of the Subcommittee on Chemicals of the Committee on Roadside Construction and Maintenance of the American Roadbuilders' Association. This Committee met in Washington with C. O. Eddy, Niagara Chemical Division, Food Machinery and Chemical Corp., Middleport, New York, serving as chairman. About 27 people attended the session.

Many interests were represented, including those primarily concerned with wildlife, disease control, insect control, weed control, and special problems related to ragweed.

The next meeting of the Committee is scheduled for October 8 in Columbus, Ohio. This date was selected to immediately precede a four-day short course held by the Ohio Highway Department on the subject of highways.

Publicity Award To NPFI

Russell Coleman, (right) executive vice president of the National Plant Food Institute, receives the American Public Relations Assn.'s Silver Anvil Trophy awarded in the field of agriculture from Hayes Dever, chairman of the awards committee. The presentation for the association was made in Philadelphia on April 26.



Nitro-Chemicals To Expand

Construction of a \$150,000 addition to the Northwest Nitro-Chemicals Ltd. plant in Medicine Hat, Alberta, Canada, will begin late this month. The new unit will permit the production of four new fertilizer formulations.

With approaching capacity operations, the new addition is expected to help meet present demands as well as act as a cushion for new outlets.

W.A.C.A. Meeting In Oct.

The fall meeting of the Western Agricultural Chemicals Assn. will be held at the Villa Hotel, San Mateo, Calif., on Oct. 7 and 8.

Among the scheduled speakers is Dr. M. W. Allen, Department of Nematology, University of California, Berkeley, who will discuss nematodes and the application of nematocides. William A. Harvey, weed control specialist, University of California Extension Service at Davis, will explore some economic aspects of weed control.

1,000 At CSMA Meeting

The almost 1,000 delegates to the 43rd mid-year meeting of the Chemical Specialties Manufacturers Association, held at the Drake Hotel in Chicago, May 20 to 22, were told that nearly 17 million gallons of liquid and slightly more than seven million pounds of powder insecticides were sold in the U. S. last year.

The insecticide figures, contained in the CSMA's 1956 Insecticide Survey, are based upon confidential reports of sales from 173 U. S. producers of insecticides.

Among the speakers at the meeting was James B. DeWitt of the U. S. Fish and Wildlife Service, Laurel, Md., who spoke on "Rodent Control in Relation to the Food Industry."

Morris Alpert, Department of the Navy, and Col. Ralph W. Bunn, Armed Forces Pest Control Board, presented a paper reviewing the present procurement of pest control chemicals by the military.

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CAN BE USED AROUND FOOD
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The truth about Tabutrex

23

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TABUTREX has given "insect repellency" an entirely new meaning. Now, for the first time, it is possible to meet the vast consumer demand for a **SAFE, ECONOMIC, TRULY EFFECTIVE** fly, roach and ant repellent.

TABUTREX has been approved for use on dairy cattle.

TABUTREX builds a barrier against house flies, biting flies, roaches and ants.

TABUTREX repels even resistant flies and roaches...they just can't stand it (Humans and animals don't even notice it.)

TABUTREX is compatible with toxicants, but can also stand squarely alone. Soluble in oil...emulsifiable in water.

TABUTREX with its 23 proven advantages is certain to become one of your most important, most valuable, most profitable insect-control tools.

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Please rush me all important data on **TABUTREX** insect repellent.

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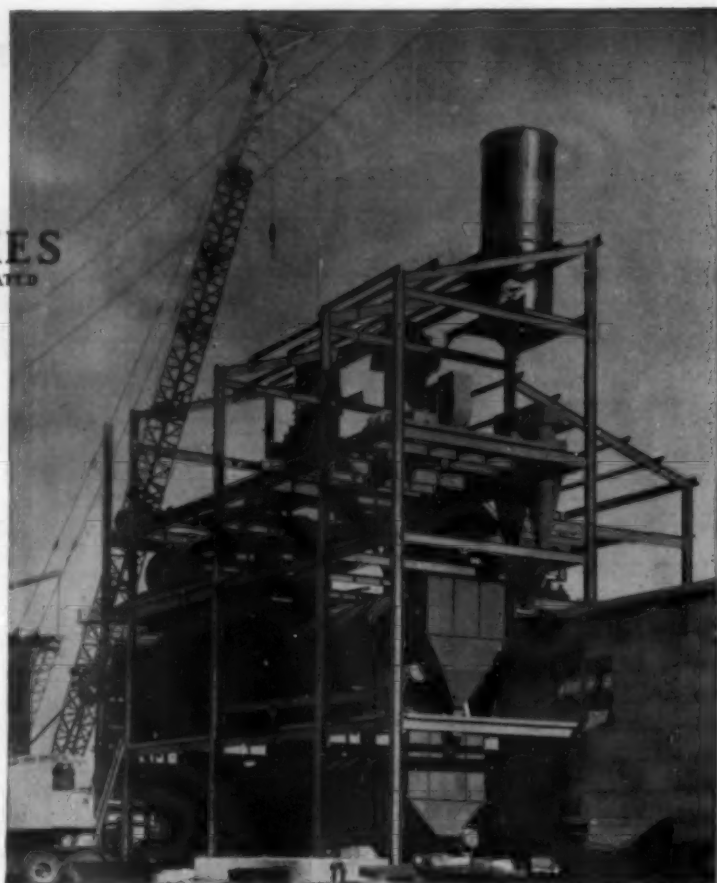
State

Type of Business

(Please put specific inquiries on separate sheet)

Fertilizer production unit of
Land O'Lakes Creameries'
Minneapolis plant, before
siding was applied

LAND O'LAKES
CREAMERIES INCORPORATED



from an idea in June to productive operation in January —the Land O'Lakes Fertilizer Plant

In the opinion of several experienced fertilizer producers, time was too short to start from scratch in June 1955 and have a new fertilizer plant in operation to meet the 1956 market demands.

But Land O'Lakes management decided to flash the go ahead sign. In July Blaw-Knox accepted the challenge—to engineer, construct, and install a TVA continuous ammoniation and granulation system in time to produce for the 1956 fertilizer season.

Engineering was well under way in August. Ground broken in September. Structure housed by November. Final installations finished in December.

Operation started in early January. Well over 30,000 tons of granular fertilizer produced and sold during spring season of 1956.

That was the tight schedule maintained by Blaw-Knox—in spite of heavy snowfalls and temperatures that dropped at times to 30° below zero.

This was, of course, an unusual assignment. But it demonstrates the ability of Blaw-Knox to handle tough jobs. So when you are considering a modernization, an expansion or a new plant program, we would welcome the opportunity to study your project with you and submit our recommendations.



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Designers, engineers and builders of plants for the process industries: chemical • petroleum • petrochemicals
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THE Spring meeting of the Carolinas-Virginia Pesticide Formulators Assn., Inc., held in the Cavalier Hotel, Virginia Beach, Va., on May 13 to 15, presented a discussion of many of the challenges facing formulators today.

J. Myron Maxwell, president of the association, convened the meeting with a welcoming address and cited many of the problems which were subsequently explored in a round table discussion.

Members of the round table panel were selected from among those attending the meeting. The first problem tackled by the panel was determining what effect the reduction of acreage would have on the consumption of agricultural insecticides. The panel concluded that there would not be any significant reduction in the sales of insecticides since the tendency among farmers is to give increased attention to the land remaining in production. Also, it was felt, the farmer is likely to place low production acreage into the soil bank, acreage that would not have received much insecticide in any event.

The question of the future of systemic insecticides was raised from the floor. The general conclusion reached seems to be that the development of systemics for widespread practical application is at least five years away. The effect of such a development on the agricultural chemical picture cannot be easily foreseen at this time, according to the panel. The main problem foreseen by the formulators is whether or not the sys-



Members of the round table were: (left to right, facing camera) John Kennedy, Stauffer Chemical Co.; Ted Riedeberg, Ted Riedeberg Associates; W. R. Peele, W. R. Peele Co., Inc.; Howerton Gowen, Howerton Gowen Co.; F. Maxwell, Maxwell Insecticide Co. (standing); John Plowden, Geigy Chemical Corp.; and William Burnside, Hercules Powder Co.

Industry Challenges Discussed At Spring Meeting of C-VPFA

temics will be already formulated, or will that be done by the formulators. Like DDT, however, the systemics are expected to fit into the industry without hurting anyone.

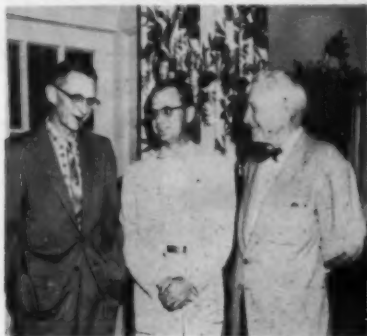
The round table members came out against the use of light traps in pest control. The panel felt that the traps do not reduce infestations beyond the point where pesticide applications are no longer needed. Also, insects are generally trapped after they have deposited their eggs and the damage is already done.

The association also went on record as being opposed to consignment practices in the industry. Members of the organization have reported be-

ing approached about the problem by bankers who seem prepared to help farmers when formulators "get out of the finance business." One fear expressed at the meeting, was that if consignment selling should be stopped, the government might step in to supervise distribution of insecticides at the request of the farmers. Those favoring consignment practices claim that, in many cases, the farmer can't afford to pay for the material before he uses it.

Members of the panel were: John Kennedy, Stauffer Chemical Co., New York; Ted Reideburg, Ted Reideburg Associates, New York; W. R. Peele, W. R. Peele Co., Inc.,

Left to right: W. P. Crown, Carolina Chemical Co.; Arthur Riddell Jr., Virginia-Carolina Chemical Corp.; and H. M. Du Boise Jr., Carolina Fly Ash Inc.



William Jennings, Kirby Chemical Co. and John H. Kennedy, Stauffer Chemical Co.



E. L. Phillips, Glendon Pyrophylite Co.; William Swanson, Mil White Co., Inc.; and John Molony, Molony Fertilizer Co.



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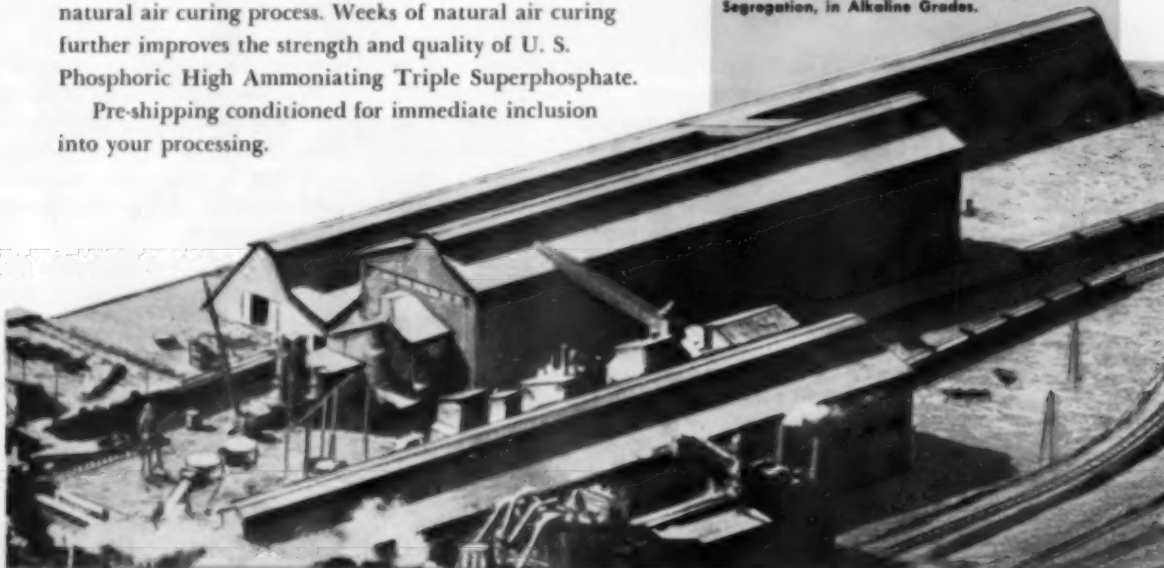
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Raleigh, N. C.; Howerton Gowen, Howerton Gowen Co.; John Plowden, Geigy Chemical Corp., Ardsley, N. Y., and William Burnside, Hercules Powder Co., Wilmington, Del.

The achievements of the Carolinas-Virginia Pesticide Formulators, since the group's inception in Jan. 1955, were listed by Mr. Maxwell in his opening address. They include the inauguration of 4H Awards, given to state winners in each of the three states, and the group's efforts in having a proposed three per cent sales tax on agricultural chemicals deferred by one of the state legislatures.

Mr. Maxwell pointed out that sales costs are from two to three times as high in the agricultural chemicals field as in all other fields, including food and automobiles. He said that the number of formulators of insecticides in North Carolina has increased from three in 1946 to approximately 23 in 1957, while the soil bank program has caused a 25 per cent reduction in cotton acreage and a 26 per cent reduction in tobacco acreage.

Although the situation is extremely competitive, Mr. Maxwell concluded, there is room enough for everyone if business is conducted at a high enough level.

No Mishaps At Swift Plants

The National Safety Council has reported that the Plant Food division of Swift and Co. has developed an outstanding safety record during the first three months of their 1957 fiscal year.

Out of a total of 27 plants working 873,696 man hours, there have been no disabling injuries.

Grady Named By Sinclair

Anthony G. Grady has been appointed national accounts representative of the Nitrogen Products division of Sinclair Chemicals, Inc., New York. His headquarters are at Chicago, Ill.

A co-developer of the "Peet-Grady Test" for insecticides, Mr. Grady joined Sinclair in 1928. He is a member of the American Assn. for the Advancement of Science, Chemical Specialties Manufacturers Assn., Entomological Society of America, and the Chicago Drug and Chemical Assn.



Velsicol Names Schumaker



George K. Schumaker has been appointed manager, Northeastern region, Agricultural Chemicals division of the Velsicol Chemical Corp., Chicago. Mr. Schumaker is responsible for coordinating Velsicol's sales activities pertaining to chlordane, endrin, heptachlor, and methylparathion insecticides. His headquarters are at the company's New York office.

New Du Pont Unit In N. J.

A new unit to manufacture "Parzate" liquid nabam fungicide has gone into production at Du Pont's Grasselli, N. J., works. This is the second Du Pont unit to produce Parzate and is expected to double the company's capacity for the agricultural chemical.

Parzate is effective against early and late blight of tomatoes and potatoes. It is also used for control of many other diseases found in truck crops.

FDA to Review Milk Tolerance

The Food and Drug Administration is facing the necessity of reviewing its policy against allowing minute quantities of chemical pesticides to show up in the nation's milk supply.

The agency recently yielded its position on pesticides showing up in meat offered in interstate commerce, and it is thought to be only a question of time before the milk question is revised. Shell Chemical Corp., New York, has filed a petition asking FDA to approve a tolerance of .05 ppm for residues of aldrin, and .02 ppm for residues of dieldrin in milk of cows. There was no indication from FDA when it would act on the proposals.

Fly Ash In Agriculture

Investigational work is now under way which gives evidence of supporting some interesting claims for the use of fly ash in the field of agriculture.

The material is a co-product of the combustion of coal which, in its finely divided spherical form, and because of its unusual adsorptive capacity, is now being used as a ferti-

lizer conditioner. Fly ash is also being considered for use in conditioning clay soils and, because of its particle size (95 per cent through 325 mesh), for pesticide carrier work.

Information on fly ash is available from Horace M. Du Bose Jr., Carolina Fly Ash, Inc., Charlotte, N. C.

Osborne Named O-M Head

The first top management changes in the Olin Mathieson Chemical Corp., New York, since it was formed in 1954, were made recently when Stanley de J. Osborne was named president and chief executive officer.

Thomas S. Nichols, president since the merger of Olin Industries and Mathieson Chemical Corp., was elected chairman. John M. Olin has been made chairman of the financial and operating policy committee and will continue to serve as chairman of the executive committee.

Mr. Osborne has been executive vice-president in charge of Olin Mathieson foreign operations since 1954. Last year he assumed additional responsibilities as vice-president for finance.

To Study Pesticide Hazards

Homer R. Wolfe has joined the staff of the Wenatchee (Wash.) Field Station of the U. S. Dept. of Health, Education, and Welfare, Public Health Service, Communicable Disease Center. As an entomologist, he will be conducting exposure studies to evaluate the health hazards associated with the agricultural uses of pesticides.

Michigan Elects Lawton



The Michigan Chemical Corp., Saint Louis, Mich., has announced the election of H. Stanley Lawton as vice president in charge of sales and market development, effective June 1. His headquarters will be at Saint Louis, where the company's largest plant and research laboratories are located.

Mr. Lawton had been employed by the Hercules Powder Co. and the Dewey & Almy Chemical Co. before joining Michigan.

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Here are two nitrogen sources you can offer your customers that leave nothing to be desired in plant feeding, and give your business a solid boost.

NITROLIME and CAL-NITRO are proven for top yields. Each is a high-quality, *non-acid forming* product that contains a guaranteed 20.5% nitrogen content. Half of this nitrogen in each case is nitrate nitrogen and half ammonia nitrogen, assuring the proper balance for greater crops.

Both Nitrolime and Cal-Nitro are fast acting and resistant to leaching. They also contain calcium, which is essential to vigorous growth and proper soil conditioning. Both come in handy, free-flowing granular form, easy to apply by hand or machine.

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Vern I. McCarthy Ends Tour With Government

Vern I. McCarthy, Jr., (right), vice president of Vulcan Containers, Inc., Bellwood, Ill., recently completed a six month tour of duty in Washington as deputy director of the Containers and Packaging division, Business and Defense Services Administration, U. S. Department of Commerce.



When Mr. McCarthy completed his assignment in Washington, H. B. McCoy, (second from right) BDSA Administrator, presented him with a flag which flew from the Capitol building. Congratulating Mr. McCarthy at the ceremony are Rep. Harold R. Collier of Illinois and Frederick H. Mueller, (left)

Assistant Secretary of Commerce for Domestic Affairs.

Mr. McCarthy is a member of the BDSA unit of the National Defense Executive Reserve, organized by the Office of Defense Mobilization to establish a reserve of business executives to serve with the Federal government in event of a national emergency.

Tent Caterpillar Outbreak

Tent caterpillar infestations in New York City and the surrounding suburban areas during May were described as the worst in many years by the city's Department of Parks.

The warm, dry weather during early May was blamed for bringing the pest out in greater numbers than usual. Public officials have been handicapped in control measures because they are forbidden by law to spray on private property.

The Department of Parks used a mixture of lead arsenate and nicotine sulfate to control the caterpillars while outside the city a preference was expressed towards DDT.

Henry A. Huston Dies

Henry A. Huston, chemist, physicist, and the oldest living alumnus of Purdue University and Bowdoin College; died recently at his home in Kew Gardens, Queens, N. Y., after a short illness. He was 99 years old.

At Purdue, Mr. Huston organized and headed the department of agricultural chemistry. He also helped to establish Indiana's first agricultural experiment station there.

Hooker Appoints Geiger

Dr. Marion B. Geiger has been appointed Director, General Development of Hooker Electrochemical Co., Niagara Falls, N. Y.

Dr. Geiger has been General Manager, Oldbury Products since the

consolidation of Oldbury Electrochemical Co. into Hooker last November 30. Prior to that time, he had been executive vice president since 1953 and a director of Oldbury since 1942.

Allen Heads Mexican Firm

Stanford A. Allen has been appointed president of Insecticidas Ortho, S. A., a Mexican affiliate of California Spray-Chemical Corp., Richmond, Calif. Insecticidas Ortho serves Mexican agriculture with insecticides, fungicides, weedkillers, and fertilizers.

Prior to joining Insecticidas Ortho in 1952, Mr. Allen was an instructor at Arizona State college and, later, sales manager for Agricultural Chemicals in Phoenix, Ariz.

Diazinon For Fly Control

Diazinon, a product of Geigy Agricultural Chemicals division of Geigy Chemical Corp., Ardsley, N. Y., has been approved by the U. S. Department of Agriculture for fly control use in food processing plants.

Tainted Air Damages Crops

A University of California research team has reported that air pollution is costing farmers millions of dollars annually in crop damage throughout the nation.

The report was made at a meeting of the division of refining of the American Petroleum Institute in Philadelphia on May 14. Co-authors of

the paper were Ellis F. Darley and Robert F. Brewer.

The report said that crop losses caused by pollution amounted to \$5 million each year in the Los Angeles area and more than \$1 million in the San Francisco area.

Salt Lake City Sales Head

Thomas R. Cushing has been named head of the Salt Lake City, Utah, office of Wilson & Geo. Meyer & Co., Intermountain. Mr. Cushing has also been made sales manager of the firm.

For the past four years he has been manager of the phosphatic fertilizer sales department of Wilson & Geo. Meyer & Co. in San Francisco.

Wilson & Geo. Meyer & Co. Intermountain is a subsidiary of the 107-year-old firm of Wilson & Geo. Meyer & Co., Western distributors of agricultural and industrial chemicals, which has its headquarters in San Francisco and district offices and warehouses in Seattle, Portland, and Los Angeles.

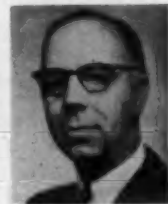
Magnet Cove Barium Corp. Names Three To Executive



R. L. Snook



G. Morrical



H. M. Gwyn, Jr.

The Magnet Cove Barium Corp., Houston, Tex., has announced three appointments to the newly created positions of district managers of the company's industrial products department.

Robert L. Snook was named Southwestern district manager, Gerry Morrical is Midwestern district manager, and H. M. Gwyn Jr. joins the department as Eastern district manager. The appointees are responsible for sales development in their districts.

The Industrial Products Department is concerned with marketing Wyoming (swelling) bentonite, Attapulgite fullers earth, barytes, and a Kaolin-type Texas clay to industries such as foundry, refining, chemical, and insecticide.

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Toronto 14, Can., 100 North Queen St. OLlmond 5-6370



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TVA Plans Demonstration Of Continuous Ammoniator

THE Tennessee Valley Authority's office of chemical engineering will hold a demonstration of some of its latest developments in fertilizer technology at the Wilson Dam Laboratories near Sheffield, Alabama, on June 18, 19, and 20. The demonstration will center around use of the TVA-developed continuous ammoniator.

The purpose will be to show how this equipment can be used to produce cheaper, better, or higher analysis fertilizers.

A series of pilot-plant runs will be made, each run designed to illustrate a different process of the use of new combinations of raw materials. All members of the fertilizer industry, the press, and other interested persons are invited to attend.

Tours will be arranged for those who wish to see the TVA fertilizer manufacturing facilities and the chemical and agronomic research laboratories. Those planning to attend the demonstration are requested to notify J. H. Walthall, director of chemical development, Tennessee Valley Authority, Wilson Dam, Ala.

The use of diammonium phosphate will be one of the new methods demonstrated. It has the advantages of permitting higher analysis than can be obtained with conventional materials and increasing water-soluble P_2O_5 content. The demonstration run will show the production of 12-24-12 from diammonium phosphate, concentrated superphosphate, ordinary superphosphate, potassium chloride, and one of the new "dehydrated" nitrogen solutions.

The production of granular high-analysis fertilizer will be demonstrated using concentrated phosphoric acid, ammonia, ordinary superphosphate, and potassium chloride. Besides the advantage of economy in shipping, the concentrated phosphoric acid has the property of producing more heat in granulation processes than is obtained with acid of normal strength.

A demonstration of producing ammonium phosphate-nitrate fertilizers by using phosphoric acid and ammoniating solution as the principal sources of P_2O_5 and N, respectively,

will be held. The advantages of the ammonium phosphate-nitrates are their high analysis and high water solubility. In the demonstration run, 8-16-32 will be made in the continuous ammoniation-granulation pilot plant from wet-process phosphoric acid, ammoniating solution, and potassium chloride.

The use of the continuous ammoniator in the production of nitric phosphate is a modification of previous nitric phosphate processes developed by TVA and will also be demonstrated. The modification retains the economic advantage of using phosphate rock as the principal source of P_2O_5 but provides a method which can be used in many existing granulation plants with fairly minor additions and changes.

Production of ordinary superphosphate for immediate ammoniation will be demonstrated in a pilot-plant cone mixer and a Broadfield-type den. Compared with the conventional procedure, a higher acidulation ratio, more finely ground rock, and a lower acid concentration are used in producing this superphosphate.

A final demonstration will show a one-step process for producing granular concentrated superphosphate from phosphate rock and wet-process acid. The continuous ammoniator is used in this case for acidulation and granulation.

Allied Sales and Net Fall

Allied Chemical & Dye Corp. showed a decline in net earnings in the March quarter to \$1.01 a share compared with \$1.28 a share in the same quarter in 1956. Sales were off slightly to \$165,854,000 from \$166,042,000 a year ago. The company has been plagued by over production in ammonia and nitrogen, prices have been off, and earnings have been further reduced by heavy charges for equalization of freight with competitors' plants. (In late May a price advance of \$8.00 a ton was announced on anhydrous ammonia.)

In connection with a question about Allied's holdings of Virginia Carolina Chemical Co. preferred, and that company's reported recap-

italization plans, an Allied official said, "I know they are working on a plan, but I am almost sure they are not ready to present it, because they would have told us about it."

Agricultural Science Award

The Hoblitzelle National Award in the Agricultural Sciences, consisting of \$5,000 and a gold medal to the person who has made the most important scientific contribution to American agriculture for the preceding four year period, will be presented in May, 1958.

Nominations for the award may be made by individuals, groups, or agencies and should be in not later than Oct. 1, 1957. The award will be made publicly through the Karl Hoblitzelle Agricultural Laboratory of Texas Research Foundation at the annual Field Day and Awards dinner at Renner, Tex., May 2, 1958.

N.F.S.A. Names Committees

The National Fertilizer Solutions Assn., Chicago, has announced the activation of five committees. The committees appointed, together with their chairmen, are as follows:

Activities Committee, W. Harold Schelm, Schelm Bros. Inc., Peoria, Ill.; Convention Planning Committee, Ernest R. Harper, Nitrogen Division, Allied Chemical & Dye Corp., Indianapolis, Ind.; Membership Committee, Wayne R. Johnson, Johnson Bros. Mills, Inc., Shenandoah, Iowa; Standards Committee, Roy F. Broyhill, The Broyhill Co., Dakota City, Nebr.; and the Statistical Survey Committee, George H. Serviss, G.L.F. Soil Building Service, Ithaca, N. Y.

NAC Plans N. J. Meeting

The annual meeting of the National Agricultural Chemicals Association will be held at Spring Lake, N. J., on Sept. 4, 5, and 6, 1957.

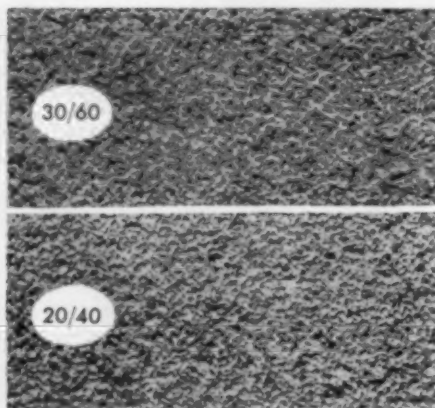
At a recent meeting of the NAC Board of Directors in San Francisco, it was decided that, in the future, one annual meeting a year will be held in the Fall at various locations throughout the country. Small group meetings with members of the staff are contemplated to supplement the annual meetings.

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proven granular formulations to be efficient, economical and easily
applied, with pesticide residues on foliage at harvest time greatly
reduced. The method is already established for combating Euro-
pean corn borer, Japanese beetle larvae, white fringed beetle
grub, corn root worm, wireworm, mosquito larvae, and other
turf and soil pests.

Because of the amphibole-like structure of Floridin adsorptive
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the popular 20/40 and 30/60 ranges, regular Florex and Floridin
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Build your granular pesticide formulations and your fertilizer-
pesticide mixtures on Florex or Floridin granules. Use the type
carrier which has actually given superior performance in field tests.

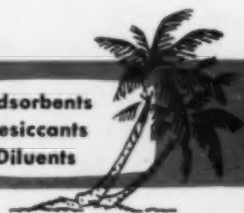
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Arthur W. Mohr, president of California Spray-Chemical Corp. recently was honored in celebration of his 35th anniversary with Standard Oil. P. L. Fahrney (left), vice president of the Standard Oil Company of California, presented a service award to Mr. Mohr.

Calspray Honors A. W. Mohr

Arthur W. Mohr, president of the California Spray-Chemical Corp., Richmond, Calif., was recently honored in celebration of his 35th anniversary with Standard Oil.

Mr. Mohr, who maintains offices in Richmond, began his career with Standard Oil in 1922 as a chemist in the fuel oil and asphalt laboratories, which later became American Bitumuls. In 1930, he was appointed district manager for the American Bitumuls Co. in St. Louis and later district manager for the same concern with headquarters in Baltimore, Md.—the position he held until his appointment in 1946 to his present post.

A past president of the National Agricultural Chemicals Assn., Mr. Mohr is a member of the Board of Directors of the Oronite Chemical Co., San Francisco.

Calspray's insecticides, fungicides, weed killers, and fertilizers are marketed under the "Ortho" trademark in 53 countries of the world.

Husain Studying Elm Fungus

Akhtar Husain, of Uttar Pradesh, India, has joined the staff of The Connecticut Agricultural Experiment Station, New Haven, for five months to carry on technical studies relating to Dutch elm disease.

Dr. Husain is primarily concerned with the fungus that causes Dutch elm disease. He recently completed his graduate studies at North Carolina State College where his re-

search centered around investigations of bacterial diseases of tobacco which act in some ways like Dutch elm disease fungus.

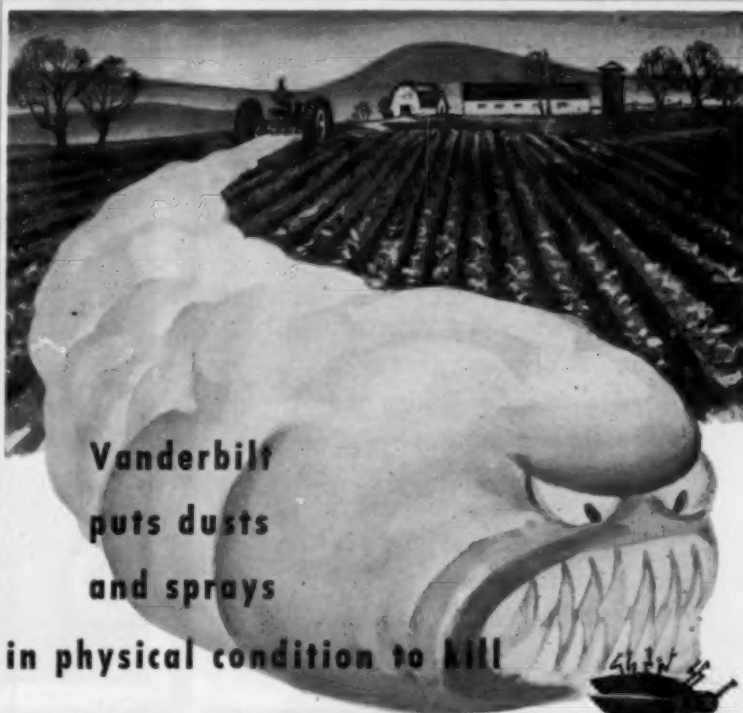
Best Co. To Expand Plant

The Best Fertilizer Co. has announced plans for expansion of their present plant at Lathrop, Calif., to include additional facilities for the manufacture of liquid fertilizers. In addition to fertilizers the plant at Lathrop produces other chemicals, one of which is sulfuric acid.

Stauffer Plant In Omaha

Stauffer Chemical Co., New York, has recently completed installation of a new unit at Omaha, Nebr., to produce a broad range of granular insecticides. The new facility will produce granular formulations of DDT, aldrin, and heptachlor.

Initially, Stauffer is manufacturing five per cent DDT granular, 20 and 25 per cent aldrin, and 20 and 25 per cent heptachlor. The Omaha plant will supply the entire Mid-Western area.



For full killing power, your dusts and sprays need the right physical properties — to absorb and disperse the toxicant thoroughly — to make them cling, cover, and stick in doing their deadly work. Vanderbilt carriers, diluents, and dispersing agents are specially developed to give dusts and sprays these important physical properties that mean more efficient coverage and increased lethal effectiveness in the field.

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Outstanding dispersing agents. Produce increased toxicant effectiveness through better dispersion of wettable concentrates.

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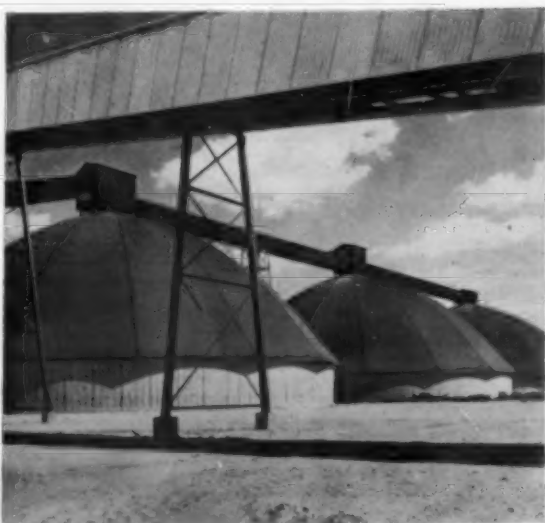
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Stauffer Makes 2,4-D Paste

A paste form of 2,4-D is now being made by Stauffer Chemical Co., New York, and marketed in the North Central and Pacific Northwest States.

The most important feature of the 2,4-D paste is its low volatility. It has been safely used, experimentally, to kill broad leaf weeds between grape rows and on lawn areas adjacent to susceptible vegetable plantings. It has also been successfully applied in roadside sprayings.

Stauffer agronomists describe the paste as a formulation of 2,4-D acid in conveniently usable form. They cite it as being as effective as 2,4-D ester formulations and as safe to use near susceptible crops as 2,4-D amine formulations.

Although Stauffer is currently marketing the new product only in the North Central and Pacific Northwest States, the company anticipates national sale later this season.

Stedman Joins Frontier

Howard A. Stedman has been named product manager for grain fumigants of the Frontier Chemical Co., Wichita, Kans. Working under M. E. Clark, vice-president-marketing, Mr. Stedman has charge of both technical service and sales for all Frontier grain fumigant products.

Mr. Stedman joins Frontier following three years with the Olin-Mathieson Chemical Corp. as product manager in charge of grain fumigants. Previously he was head of the Stedman Laboratory in Kansas City, Kans. Mr. Stedman is making his headquarters in Wichita.

Meggitt On Rutgers Staff

Dr. William F. Meggitt has been appointed research agronomist with the Weed Investigations Section of the U. S. Department of Agriculture with an office in the Farm Crops Department, College of Agriculture, Rutgers University, New Brunswick, N. J.

Dr. Meggitt, a native of Ohio, received bachelor and master of science degrees from Ohio State University. He received a doctor of philosophy degree from Rutgers in 1955.

Dr. Meggitt will have special responsibilities for studying weed problems in horticultural crops.

Japanese Visit Hardy Plant

A group of Japanese agricultural specialists touring California to study livestock feed manufacturing and equipment, visited the Hardy Scales plant last month. Leader of the group was Jirohiki Kondo, an official of the Japanese Ministry of Agriculture and Forestry.

Cyanamid Appoints Sheldon

North American Cyanamid Ltd. has appointed James B. Sheldon to manage the company's urea plant to be built at Hamilton, Ontario. The Canadian firm is a subsidiary of American Cyanamid Co., New York.

Mr. Sheldon is currently assistant plant manager at North American Cyanamid's Welland plant at Port Robinson, Ont. The Hamilton Bay plant is scheduled for completion in mid-1958. It will be the first Canadian plant to manufacture urea.

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U. S. Borax Uncovers Largest Sodium Borate Ore Body



The Pacific Coast Borax Co., a division of United States Borax & Chemical Corp., New York, has uncovered the largest known sodium borate ore body in the world at their new mine at Boron, Calif.

W. H. Wamsley, mine manager, examines the tincal ore, reached at a depth of 137 feet. Production will begin this month.

man of this year's campaign. He has been a member of the board since 1955.

Pfizer Names Two

J. Jerome Thompson has been elected vice president in charge of agricultural sales and Thomas M. Cooney has been named as assistant secretary of Chas. Pfizer & Co., Inc., Brooklyn, N. Y. Mr. Thompson had been manager of the agricultural sales division and Mr. Cooney has been a member of the company's legal staff.

O-M Opens Ohio Office

The Plant Food Division of Olin Mathieson Chemical Corp., New York, has opened an area headquarters office in Columbus, Ohio. The office is managed by Charles A. Wood, East Central sales manager.

The Olin Mathieson Corp. expects that local sales supervision will provide improved service on the division's Ammo-Phos fertilizers, pesticides, anhydrous ammonia, and irri-

gation systems to farmers of Ohio, Michigan, Western Pennsylvania, and Western West Virginia.

Woods In Red Cross Post

J. Albert Woods, president of the Commercial Solvents Corp., New York, has been elected a vice-chairman of the New York Chapter of the American Red Cross. Mr. Woods has been active on the chapter fund raising committee and was vice-chair-

Plan New Fertilizer Plant

A \$6 million chemical fertilizer plant will be built by the Chemical and Industrial Corp., Cincinnati, at Port Wentworth, Ga. Plans are being drafted for the plant which will duplicate similar operations at Richmond, Calif., and Point Comfort, Ohio.

The company proposes to dredge a channel from the Savannah River to permit barge access to the plant site.

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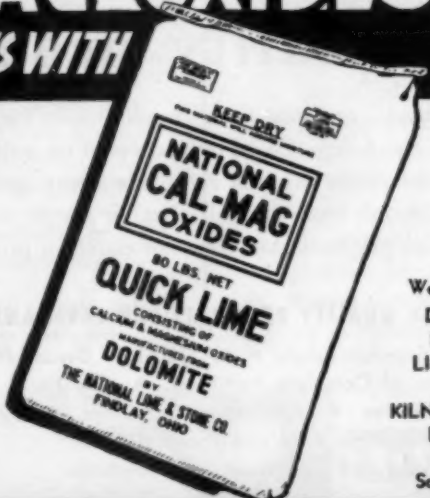
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Port Hope, Ontario



INDUSTRY MEETING CALENDAR

June 9-12—National Plant Food Institute, The Greenbrier, White Sulphur Springs, W. Virginia

June 17-19—Association of Southern Feed and Fertilizer Control Officials, 15th annual convention, Dinkler-Tutwiler Hotel, Birmingham, Alabama.

June 26-28—American Society of Agricultural Engineers, Michigan State University, East Lansing, Mich.

June 26-28—Pacific Branch, ESA, Multnomah Hotel, Portland, Ore.

July 17-19—Southwestern Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Texas.

Aug. 13-14—Ohio Pesticide Institute, Ohio Agricultural Experiment Station, Wooster, O.

Sept. 4-6—Annual meeting, National Agricultural Chemicals Association, Hotels Essex & Sussex, and Monmouth, Spring Lake, N. J.

Sept. 8-15—International Congress of Crop Protection, fourth international meeting, Hamburg, Germany.

Sept. 11-13—Florida Entomological Society, San Juan Hotel, Orlando Fla.

Oct. 2-4—Beltsville Cotton Mechanization Conference, Shreveport, La.

Oct. 3-5—Pacific Northwest Plant Food Assn., Sun Valley, Idaho.

Oct. 17-18—Assn. of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C.

Oct. 29-31—Entomological Society of Canada, and Entomological Society of Alberta, Lethbridge, Alta., Canada.

Nov. 3-5—California Fertilizer Association, St. Francis Hotel, San Francisco, Calif.

Nov. 6-8—Fertilizer Industry Round Table, Sheraton Park Hotel, at Washington, D. C.

Nov. 17-19—National Fertilizer Solutions Assn., Netherland-Hilton Hotel, Cincinnati, Ohio.

Dec. 2-5—Entomological Society of America, National meeting jointly with cotton states ESA, Hotel Peabody, Memphis, Tenn.

Dec. 9-12—Chemical Specialties Manufacturers Association, Hollywood Beach Hotel, Hollywood, Fla.

Dec. 9-12—Vegetable Growers Association of America, Jung Hotel, New Orleans.

Dec. 11-13—Agricultural Ammonia Institute, Hotel Marion, Little Rock, Ark.

Dec. 12-13—Cotton Insect Control Conference, Peabody Hotel, Memphis, Tenn.

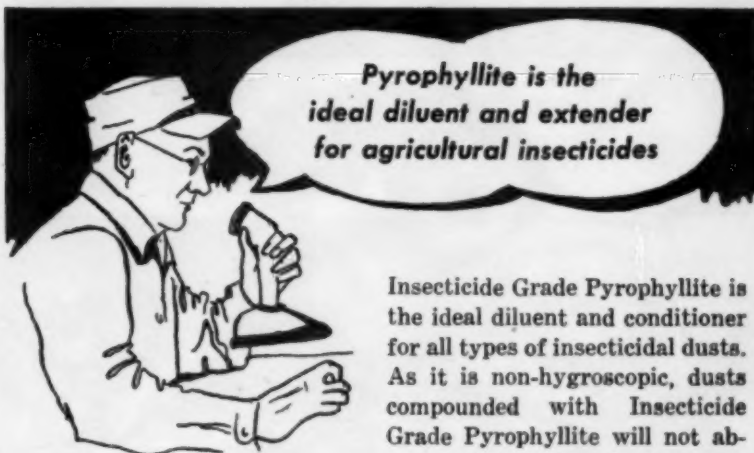
Jan. 13-15—1958 Weed Society of America and Southern Weed Conference, Peabody Hotel, Memphis, Tenn.

Jan. 21-23—1958 California Weed Conference, San Jose, Calif.

Adams Named St. Regis Head

William R. Adams has been elected president of the St. Regis Paper Co., New York, succeeding Roy K. Ferguson, who continues as chairman of the board and chief executive officer. Mr. Adams had been vice-president in charge of manufacturing.

In other executive changes, Edward R. Gay was elected vice-chairman of the board, and Arch Carswell and Benton R. Cancell were elected executive vice-presidents.



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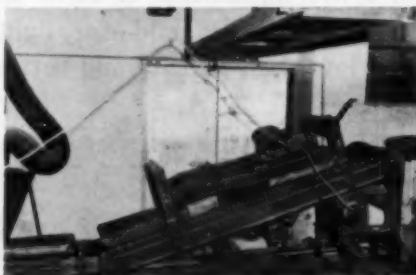
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AGRICULTURAL CHEMICALS

INSECT REPORT

(From Page 62)

pest was common in east central Oklahoma counties, averaging 20-50 per linear foot of row in small grain. Some damage by the pest resulted to barley in Graham county, Arizona. The greenbug, which at times in past years has caused severe damage to small grains, continues light with the exception of a few fields in Hansford and Ochiltree counties, Texas. By early May, grasshoppers were hatching in several states but only in California had control operations started. By the middle of May Utah, Nebraska, Kansas, Oklahoma, Missouri, Texas, New Mexico, Minnesota, Iowa and Illinois had reported grasshoppers hatching but populations were still below an economic level.

Armyworms had not developed into a major problem in any area by early May. Larval populations required control in the Red River Valley of Louisiana and populations were reported heavy in Brazos County,

Texas. Although infestations were present the first of May in small grain in several Arkansas Counties, no economic damage is expected unless a second brood develops. Some armyworms were reported from the north-eastern area of Virginia in early May. The first moth was trapped at Glassboro, New Jersey, April 21 and moths were heavy at lights in Delaware, April 28-29.

The spotted alfalfa aphid, which for the past three years has been a very serious pest, had built up rather slowly through early May. Utah reported injurious populations in Washington County and some localized damage was also recorded in Arizona. Heavy populations of the spittlebug were reported from Indiana and southwestern Virginia.

The green peach aphid was reported as being more abundant on peach trees in the lower Yakima Valley of Washington this spring than for the last several years. This pest also reported on peaches from several areas in Utah. The first codling moth emergence from cages at Villa

Ridge, Illinois was on April 30; in Adams County, Pennsylvania emergence was May 1. At Salem, Oregon a single adult was trapped April 29 which was three weeks earlier than the 1956 emergence date.

European red mite control was warranted in Vincennes, Indiana, by the first of May. In Ohio, the egg hatch was very heavy, with some difficulty of control being experienced in the southern area. Hatching was under way by late April in New York, Illinois, Pennsylvania and Oregon. The pest was building up in untreated orchards in Massachusetts.

The Colorado potato beetle by early May was causing damage to Irish potatoes in Granville County, North Carolina. Injury to potatoes in eastern Virginia was light and scattered. Adults were numerous in Delaware and Missouri. Spider mites were causing foliage damage to strawberries in the Orleans, Indiana, area. Mites were responsible for injury to strawberry plants in eastern Virginia and infestations were reported from Massachusetts and New York.



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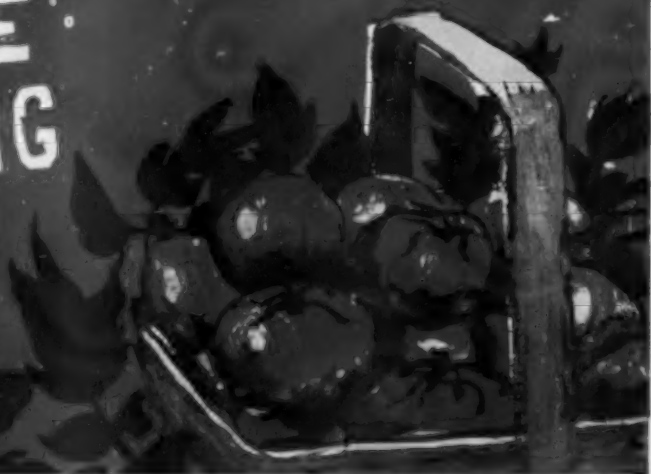
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New Phosphate Source Tested Off California Coast

SINCE the close of World War II, the U. S. phosphate industry has progressed with giant strides until the annual production rate is twice that attained in any year of the industry's history, according to a paper presented at the Pacific Southwest Mineral Conference in Reno, Nev., on April 5 and 6.

Prepared by W. D. Smiley, senior ceramic technologist, Stanford Research Institute, Menlo Park, Calif., and A. K. Schellinger, division of mineral engineering, Stanford University, Stanford, Calif., the paper stated that most of the elemental phosphorus plants built since World War II have been in the Idaho, Montana, and Wyoming region, where 60 per cent of the nation's phosphate rock reserves and 25 per cent of the world's supply are found.

The lack of a phosphate producer in the western Pacific Basin, however, and the costs of transporting the rock have left many potential markets for phosphates untapped. The report stated that this lack has stirred scientific and economic curiosity in the large low-grade phosphate deposits in Santo Domingo, off the southwest shore of the Baja California peninsula. The sands, which contain about one billion tons of phosphate concentrates of commercial grade, extend for some 45 miles.

The Stanford Research Institute was asked to study beneficiation processes to determine those most suitable for economic treatment. The institute developed several economical processes to beneficiate the low-grade sands and produce phosphate concentrates of commercial fertilizer grade. Flotation is the primary method of concentrating the phosphate.

The institute's paper said that the phosphate process utilized at Baja California has a number of economic advantages over the Florida beneficiation process. Overburden stripping is bypassed. Ore sizing is not required. Slimes are not present, in Florida they must be removed by cycloning the feed prior to flotation. Finally, the

Baja California phosphate is less sensitive to water ionic conditions and can be floated in sea water.

The great potential advantage for Pacific Basin consumers is the location of the Baja California deposits on deep water. This could make fertilizer needed by Mexican farmers economically available.

Farmers adjacent to the Florida deposits use over ten times the amounts of P_2O_5 per capita as do the

farmers of the Pacific Basin, particularly Mexico and California. Because the Baja California deposit is so handy, the Stanford Research Institute report concludes, it is quite likely that the consumption in the agricultural valley of the West Coast of Mexico will rise spectacularly.

Calif. Urea Plant Producing

The Shell Chemical Co., New York, has brought its new Urea plant at Ventura, Calif., into production. The plant, which is the only one of

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AGRICULTURAL CHEMICALS

its type west of the Rockies, produces the high analysis nitrogen fertilizer for Pacific Coast markets.

The new plant was built adjacent to Shell's Ventura ammonia plant, the source of raw materials for the manufacture of urea. The company also has ammonia manufacturing facilities at Pittsburgh, Calif.

Cal. Chemical Co. Formed

The California Chemical Co., San Francisco, has been established to consolidate the chemical activities of the Standard Oil Co. of California.

The new organization coordinates the activities of two presently existing subsidiaries of Standard Oil, California Spray-Chemical Corp., Richmond, Calif., and Oronite Chemical Co., San Francisco.

G. L. Parkhurst has been named Chairman of the Board and chief executive officer of California Chemical Co. P. L. Fahrney has been named president. Both are vice presidents of Standard Oil Co. of California. Named vice presidents of the new company were T. G. Hughes, president of Oronite, and A. W. Mohr, president of Calspray. Oronite and Calspray are now subsidiaries of California Chemical Co.

H. W. Arrowsmith Retires

H. Wilson Arrowsmith has announced that he is retiring on June 1 after 32 years in the agricultural chemicals business.

Mr. Arrowsmith was employed by the American Cyanamid Co., New York, in their agricultural chemicals division for 25 years. In 1952 he purchased the Western Farm Chemical Co., Walnut Grove, Calif., and moved it to Woodland, Calif. Western Farm Chemicals was sold to John Taylor Fertilizers last year and has been doing business as Roy Riegels Chemicals at Woodland.

N. F. S. A. Meeting In Nov.

The 1957 convention of the National Fertilizer Solutions Association will be held at the Netherland-Hilton Hotel in Cincinnati, Ohio, Nov. 17 to 19.

Among the topics to be discussed at the convention are: trace

elements, various pesticides in fertilizers, and the possibilities of the new hormones. Supplier conference rooms will be made available for suppliers to set up display boards, show samples, and distribute literature.

Turner Named Clark Co. V-P

The Clark Equipment Co., Benton Harbor, Mich., has elected George Turner as a vice president. Mr. Turner is in charge of production operations at Clark's transmission division in Jackson, Mich.

90 Plants By Cal. Firm

Fabricated Metals, Inc., San Leandro, Calif., has brought to 90 its total of liquid fertilizer plants constructed, following the completion of four new plants in New Jersey, Idaho, and California.

The four plants were built for: Fertilizers, Inc., in Linden, Calif.; Delaware Valley Chemical Co., at Swedesboro, N. J.; Farm Service, Inc., at Kimberly, Idaho; and Melville E. Willson Co., Madera, Calif.



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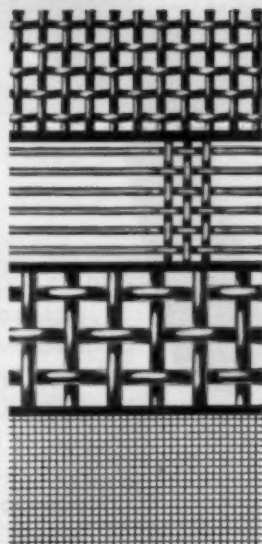
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Miami Pest Control Session

The Florida Agricultural Extension Service recently presented the first phase of a three phase course at the Dade County Vocational Agricultural school in Miami.

Approximately 500 people attended the event which was concerned primarily with insects and diseases of plant life. The second phase, scheduled to be held this month, will be devoted to plant propagation, soils and fertilizers, and nursery management.

In addition to a series of addresses by experts in plant pathology and entomology, the recent session featured demonstrations of spray and power equipment. A large tent housed exhibits of fertilizers, insecticides, fungicides, and equipment.

Co-op Installs Granulators

Two new Blue Valley Granulation units have been installed by the Blue Valley Equipment Manufacturing and Engineering Co., Topeka, Kans., for the Indiana Farm Bureau Co-op. Association, Inc., Indianapolis,

Indiana. The units were installed in the co-op's Schererville and Jeffersonville, Ind., plants.

Arthur R. Mullin, fertilizer department manager for the association, said that the installation of the Blue Valley granulation units was prompted by "our ever-increasing demand for granular, free-flowing fertilizer, plus the trend to higher analysis mixes from lower cost raw materials."

Analysts At Purdue Course

More than 40 chemical analysts from the fertilizer industry and state control offices attended a two-day school at Purdue University on May 17 and 18 to familiarize themselves with two new methods of analysis.

The meeting was sponsored jointly by the Indiana State Chemist and the Chemical Control Committee of the National Plant Food Institute.

Those attending ran through the procedures for determining potassium by the tetraphenyl borate method and nitrate nitrogen by the reduced iron method.

Nat'l. Rose Show June 20

The American Rose Society's annual spring convention and national rose show will be held in Milwaukee, Wis., at the Shroeder Hotel on June 20 to 22.

Among the speakers on the three-day agenda are: Earl K. Wade, University of Wisconsin extension pathologist, who will speak on Fungicides and Soil Fumigants; and Charles W. Gregory, C. Gregory & Son, Ltd., Nurseries, of Chilwell, Nottingham, England, and Jean Gaujard, Roseaies Pernet-Duchet, at Feyzin, Isere, France, who will tell of roses in Europe.

McCormick Joins Diamond

Harold S. McCormick, Jr., has joined Diamond Black Leaf Co., Cleveland, Ohio, as a sales representative for tobacco stems to the fertilizer and poultry industries.

Mr. McCormick had previously been in charge of ocean vessel charter work and sales for the United States Overseas Corp., Washington, D. C.

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Spencer Cites Oldest Dealer



Dan Hardwick



W. F. Hilfiker

The results of a contest held to find the oldest fertilizer dealer in the United States have been announced by the editors of "TFD," the fertilizer trade publication of Spencer Chemical Co., Kansas City, Mo.

The contest winner is 91-year-old W. F. Hilfiker of Portland, Ind. Runner-up was 88-year-old W. F. Haenke of Gilbert, Minn.

In another division of the contest, 75-year-old Dan Hardwick, Sr., won the award for the fertilizer dealer with the most years of service. Head of the Hardwick Fertilizer Co., Loris, S.C., Mr. Hardwick has been in the plant food business continuously since 1897. George F. Voelker, Evansville, Ind., a fertilizer dealer for 59 years, was the second high man in this division.

Union Carbide Name Change

The name of Union Carbide and Carbon Corp., New York, has been shortened to Union Carbide Corp., effective May 1. The names of three divisions of Union Carbide have also been changed.

Carbide and Carbon Chemical Co. has become Union Carbide Chemicals Co.; Linde Air Products Co. is now the Linde Co.; and Carbide and Carbon Realty Co is the Union Carbide Realty Co.

Anderson Joins Sinclair

Sinclair Chemicals, Inc., New York, has appointed Benjamin T. Anderson as technical service engineer in the company's Nitrogen Products division. Mr. Anderson is furnishing technical assistance to fertilizer manufacturers and industrial consumers of Sinclair nitrogen solutions and anhydrous ammonia from the company's new plant at Hammond, Ind. He is located at Sinclair's Chicago office.

AGRICULTURAL CHEMICALS

Appleton Gets New Position

Shelton Appleton, who recently transferred from the Southwest to the Peoria office of the Potash Company of America, Carlsbad, N. Mex., has assumed the responsibility for the accounts formerly serviced by



F. H. Kennedy. Mr. Kennedy is now Midwestern Sales Manager for P. C. A. Mr. Appleton has been with P. C. A. for the past three years and was formerly with the South Florida Insecticide Co., Lion Oil Co., and Armour Fertilizer Co.

NPFI Presents Scholarship

David Lee Terry, a junior at the University of Kentucky, Lexington, has been awarded the National Plant Food Institute's \$200 Agronomy Club Scholarship.

Formal presentation of the grant was made by Dr. W. H. Garman, chief agronomist of the Institute, during the College of Agriculture and Home Economic's annual awards banquet on the university campus March 28.

Escambia Names Sutherland

Dr. L. H. Sutherland has been appointed section head in the research program of the Escambia Chemical Corp., New York.

Dr. Sutherland is in charge of the analytical and certain of the process groups. His activities are divided between Cambridge and Newton, Mass., where Escambia presently has its research and technical service facilities.

Hooker Elects Dennis

The board of directors of the Hooker Electrochemical Co., Niagara Falls, N. Y., recently elected Frank W. Daniels to the board. Mr. Dennis, who is also vice-president in charge of industrial relations, replaces J. H. Babcock who retired from the firm on May 1.

Maas Plans Expansion

The A. R. Maas Chemical Co. has taken an option on 75 acres of industrial property at Richmond, Calif. The first construction planned is a phosphoric acid plant and a catalyst plant.

A division of Victor Chemical Works, Chicago, A. R. Maas maintains its offices and plant at South Gate, Calif., where it manufactures sodium phosphates, photographic chemicals, and organic chelating agents.

ASA Service on Names

The American Standards Association is offering a means of obtaining national recognition of common names to replace chemical names in technical and sales literature and on labels. They suggest that manufacturers, formulators and other organizations may register a common name through the ASA Committee on Common Names for Pest Control Chemicals, K62. A procedure for applying for acceptance is offered by the Association which is located at 70 East 45th Street, New York City.

An application fee of \$300 must accompany the "statement" prepared and submitted by the "sponsor" for each common name. For each common name approved by the ASA, a standard will be published announcing for general use the common name for the specified 100 per cent pure pest control chemical.

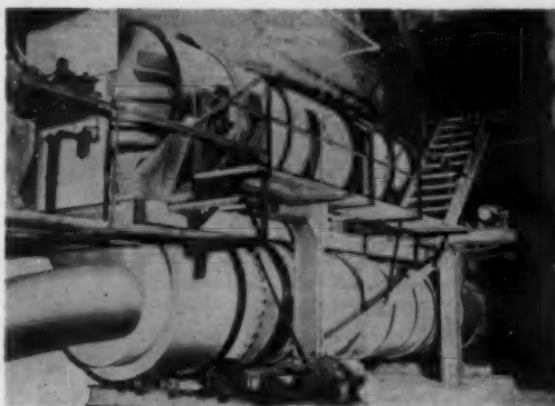
Re-Mark Buys Supply Co.

The Re-Mark Chemical Co. has bought out the Fort Pierce, Fla., branch of the Glade & Grove Supply Co., Princeton, Fla. The acquisition was achieved through transfer of some 92,000 shares of Re-Mark's Class A preferred stock to Glade & Grove owners, making the purchase price close to \$300,000.

Blue Valley Unit Installed

The Blue Valley Equipment Manufacturing & Engineering Co., Topeka, Kans., has installed a Blue Valley Granulation Unit at the Hagerstown, Md., plant of the Central Chemical Corp.

Pictured here is the new Blue Valley unit, showing the dryer-granulator and cooler drums. Mixing, ammoniation and screening parts are not shown.



Pesticide Effect on Wildlife

The Department of Interior has approved an idea advanced in Congress for a study of the effects of pesticides on fish and wildlife. Assistant Secretary of Interior, Ross L. Leffler, says such a survey is necessary for the protection of these valuable natural resources. H. R. 783 specifically directs the department to make such a study.

Assistant Secretary Leffler said that it should be possible for sponsors of spraying projects to have advice on the possible effects of the spraying on wildlife, suggestions as to timing and the formulations needed to accomplish the desired effect with a minimum damage to fish and wildlife.

Hazardous Bill to Committee

The "Federal Hazardous Articles Act" (S. 1900) introduced in the Senate in April has been referred to the Committee on Interstate and Foreign Commerce. The act would repeal the Federal Caustic Poison Act of 1927, and would require that packages coming under its jurisdiction carry the following information on the label: name and place of business of the manufacturer, packer or distributor; common name or the chemical name of the hazardous substance or each component which contributes substantially to its hazard; signal words such as warning, danger, or caution; an affirmative statement of the principal hazard, such as flammable, vapor harmful, causes burns, etc.; instructions for first aid treatment; handling and storage instructions . . . and other provisions.

Note to Manufacturers and Formulators—



QUALITY SERVICE DEPENDABILITY

- DDT—** PENCO Pentech—the select friable granular form of technical DDT for maximum production.
PENCO DDT Technical—in lump, flake or ground form, to meet your processing needs.
PENCO DDT D-50—50% DDT Dust Base—a uniform, free-flowing dust base, ideal for extending to finished dusts.
- BHC—** PENCO High Gamma BHC Technical—46% gamma isomer typical content for production by grinding, melting, or dissolving of more highly concentrated dust bases, wettable powders or liquid formulations.
PENCO BHC Technical—the natural isomer (typically 14% gamma isomer) in convenient flake form, for processing into dust bases or finished cotton dusts.
PENCO BHC D-12—contains 12% gamma isomer BHC for production of finished dusts.
PENCO BHC-DDT D-9:15—the combined BHC-DDT concentrate for direct extending to cotton dust in the 3:5 ratio.

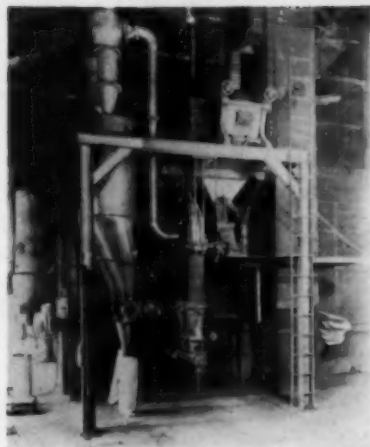
PENNSALT OF WASHINGTON DIVISION
PENNSALT CHEMICALS CORPORATION
(Formerly Pennsylvania Salt Manufacturing Company of Washington)
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Berkeley, Calif. Los Angeles, Calif. Montgomery, Ala. Portland, Ore.



**Pennsalt
Chemicals**

Equipment, Supplies, Bulletins

FEP Grinding Mills



Fluid Energy Processing & Equipment Co., Philadelphia, offers a complete line of grinding equipment for use on insecticides, clays, ceramics, pigments, abrasives, etc. N. Stephano, president of the firm, and Frank Albus, vice president, formed Fluid Energy Processing & Equipment Co. in 1955. Both were formerly with C. H. Wheeler Manufacturing Co.

The firm is equipped with test and custom grinding facilities, for grinding to micron and sub-micron sizes.

A typical single mill installation with two collectors is illustrated.

Develop Mask For Phosdrin

Experiments in cooperation with manufacturers of respiratory protective equipment have resulted in the development by the U. S. Department of Agriculture of a respirator that will give adequate protection against dusts, mists, and low vapor concentration of phosdrin encountered during field use.

Respirator No. 5058, with filter cartridge combination R-58, gives adequate protection and is manufactured by the American Optical Co., Southbridge, Mass. The Department

of Agriculture warns, however, that respirators do not provide needed protection when used by those formulating or mixing insecticides in inadequately ventilated spaces and those

applying insecticides, including aerosols, in greenhouses. Full-face gas masks equipped with tested canisters should be worn under these conditions, according to the USDA.

Piper Crop Duster Booklet

The Piper Aircraft Corp., Lock Haven, Pa., has issued an illustrated booklet describing the Piper Super Cub, a utility airplane. The agricultural version of the Super Cub, known as the PA-18-A, is fully described in the booklet.

USE WITH CONFIDENCE

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U	QUALITY & SERVICE SINCE 1939	R
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HIGH GRADE COLLOIDAL KAOLINITIC KAOLIN

"TAKO" Gives top performance **ECONOMICALLY**—used in large tonnage year after year by the insecticide-pesticide industries.

"TAKO" Airfloated Colloidal Kaolinitic Kaolin is practically a chemically pure inert colloid with exceptional qualities and excels as a diluent-carrier in formulations of insecticides-pesticides. It gives increased workability—dispersion in formulations, its purity is highly desirable due to its compatibility with chemicals, its colloid properties give increased toxic action—greater adhesive-adsorptive properties.

Non-Abrasive—Non Hygroscopic—Non Caking—Free Flowing

"TAKO" is produced under complete laboratory control. Large tonnage used by the insecticide-pesticide, fertilizer, chemical, & other large industries.

Uniform Quality — Dependable Prompt Service

THE THOMAS ALABAMA KAOLIN COMPANY

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INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

Control of Chlorosis

Chlorosis, caused by a deficiency of iron in plant and tree leaves which often results in below-standard harvest, has been reported to be effectively controlled through the use of "Greenz 26," an iron complex developed by Crown Zellerbach Corp., San Francisco, for use as a leaf spray.

The company has issued a booklet containing general recommendations for the use of Greenz 26 on various fruit and ornamental crops. The booklet is obtainable from the com-

pany's Chemical Products Division at Camas, Wash.

DuPont Cord for Sewn Bags

A rayon fiber with high wet and dry strength, Super Cordura, is offered by E. I. Du Pont de Nemours & Co., Textile Fibers Department, for sewing bag ends. One advantage of the fiber, according to du Pont is that because of its higher strength, a smaller thread can be used, which would allow a smaller needle and less perforation of the bag.

Warns Of Pesticide Hazards

"Safety in Handling Insecticides," a four-page pamphlet by Dr. F. S. Arant, zoology-entomology department head, Alabama Polytechnic Institute Agricultural Experiment Station, Auburn, Ala., warns that organic phosphates affect the transmission of nerve impulses, while the chlorinated hydrocarbons affect the nervous system.

The booklet lists the precautions to take in handling insecticides, describes the symptoms of poisoning from organic phosphates and from chlorinated hydrocarbons, and explains about treatments.

Produced by the Alabama Association for Control of Economic Pests, the booklet is being mailed to doctors, public health officials, members of the association, and Alabama insecticide dealers.

Seed and Feed for Home Lawn

The Lawn Seed Corp., subsidiary of L. Teweles Seed Co., Milwaukee, are offering a "seed and feed" touchup package for lawns. The packages are to be distributed through supermarket and grocery store sales. The package holds two and 1/16 pounds of grass seed and three and 7/16 pounds of nitrogen fertilizer in separate compartments of a plastic bag. A cardboard top has a cutout to make a carrying handle.

Key to the package are four "dotted line" cutouts in the seed compartment and two in the fertilizer container. After these are snipped out with scissors, the entire unit is turned right side up to let seed and fertilizer flow onto the ground.

Union Offers New Cutter

A new sewing head attachment that makes possible savings in both labor and material has been announced by Union Bag—Camp Paper Corp., New York. Called Union's I & C Acto-Cutter, this attachment automatically starts and stops the sewing head and also cuts the thread chain between bags.

Designed for use on the Union Special 80600E Sewing Head, The Acto-Cutter is available in two basic models.



DO YOUR DUSTS STICK TO THE LEAF?

They do if they contain Barden Clay. Barden sticks through rain or shine! Tests show 44 to 72% retention of Barden-extended insecticides after three rainfalls in seven days... 51 to 100% retention in five days without rain! Barden Clay's extra-fine particle size—90% less than two microns—gives the utmost in toxicant dispersion—and Barden's very high retentive powers hold the toxicant to the leaf.

It costs no more to be sure with Barden Clay, the scientifically-prepared diluent. Add extra power to your product...extra punch to your sales. Use Barden Clay. Samples can be had on request.

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World's Largest Producer
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**For Dust or Spray...
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✓	Improved dispersion
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✓	Greater uniformity
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GRINDS BETTER

PESTMASTER* DDT

SAVES MONEY

IT COSTS LESS TO GRIND POWDERED PESTMASTER* DDT than any DDT in flake form. Formulators know it is a hard, clean, stable technical grade. The difference in processing cost means more profit for you. The high quality of PESTMASTER* DDT means a better product for your customers. And PESTMASTER* will add uniformity and stability to your product.

If you export or use 75% DDT Wettable Powder you'll like PESTMASTER*. You'll like its resistance to tropical conditions, the careful packaging to preserve its qualities, and most of all its uniform wettable and suspension properties. Use the coupon below for samples, prices and conditions.



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JUNE, 1957

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BERKELEY CHEMICAL CORPORATION

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A CONSPICUOUS REPUTATION
FOR ACCOMPLISHMENT IN
CUSTOM SYNTHESIS
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IN THE FIELDS OF...

- *AGRICULTURAL CHEMICALS
- *SPECIALTY PRODUCTS
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HOWARD E. MILIUS, MANAGER
PRODUCT DEVELOPMENT



Millmaster Chemical Corporation

295 MADISON AVENUE, NEW YORK 17, NEW YORK

SOLE SELLING AGENT

Grain Insects Leaflet

A booklet showing in color the eleven principal stored grain insects common to all grain has been issued by the Kansas State College Extension Service, Manhattan, Kans.

In addition, the booklet shows the insects causing damage to wheat while standing in the field. The publication is intended to help speed identification and add to the general knowledge of the pests. Besides pictures of the insects and the damage they create, the folder presents grain insect control information.

New Arkell & Smiths Bag

Arkell and Smiths, Canajoharie, N.Y., are manufacturing a new "SSS" (Super Side Strength) Multi-wall bag which is a standard pasted valve bag with a reinforcing strip run longitudinally along each edge to reinforce the sides and the valve and bottom corners.

In addition to greater strength, the new bag is said to stack better and be easier to pick up and to handle.



Air Tight Silo Cap

A black, polyethylene film, manufactured by Visking Co., Terre Haute, Ind., a division of Union Carbide Corp., is used to form an air tight seal for the forage crop within an up-right silo. Corn silage scattered around the edges completes the seal.

The film, tradenamed "Visqueen," is also available as covers for loaf or trench silos and provides the farmer with inexpensive, flexible, and easy-to-construct plastic silos.

Two uses for the plastic silos, developed by the dairy department of Purdue University, are as the primary storage for silages, and as emergency or temporary measures to increase storage capacity.

Delaware Control Booklets

The Agricultural Extension Service, University of Delaware, Newark, Del., has issued two booklets on 1957 recommendations for insect and disease control on vegetables and fruit orchards and home plantings.

The booklets contain general schedules and material rates for the state. The fruit insect and disease booklet, Extension Folder 48, was prepared by L. A. Stearns, J. W. Heuberger, and R. F. Stevens. The vegetable folder, No. 49, was compiled by Heuberger, Stevens, and Donald MacCreary.

Clark Fork Truck Booklet

A new eight-page, four-color brochure describing the operational characteristics and mechanical details of the Clark electric fork trucks is now available from the Industrial Truck Division of Clark Equipment Co., Battle Creek, Mich.

WELDED ALUMINUM TANKS

In all sizes and types
for Nitrate Solutions



Elevated Tanks, Pressure Vessels, Chemical and Processing Equipment from Aluminum, Stainless and Carbon Steel, Monel and Other Alloys.

Established 1854

•COLE pioneered in building the first tank for nitrate solutions. We can supply you with welded aluminum tanks or pressure vessels for the storage or processing of agricultural chemicals, built to ASME specifications to meet all insurance requirements.

Pressure storage and corrosion-resistant storage facilities are typical of the many types of tanks we build especially for the fertilizer industry. Take advantage of our 103 years of specialized knowledge and experience. Write for booklet, *Tanks and Equipment for the Plant Food Industry*.





SYSTOX*

Registration Status

Introduced in 1951, SYSTOX has given consistent and outstandingly effective control of mites, aphids and leafhoppers on a wide variety of crops. The first systemic insecticide ever approved for use on a food crop, SYSTOX registrations now include:

Cotton	Cauliflower	Muskmelons
Oranges	Potatoes	Pineapple
Grapefruit	Lettuce	Walnuts
Lemons	Cabbage	Pecans
Seed Alfalfa	Apples	Almonds
Beans	Pears	Ornamentals
Brussels Sprouts	Grapes	Non-Bearing
Broccoli	Strawberries	Fruits

*Registered Trademark



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"Chemicals for Agriculture—Exclusively!"

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News Brevities

CENTRAL CALIFORNIA's Agricultural Forum, held May 23 at Fowler, Calif., featured discussions on soil amendments and additives by Dr. A. Lemmon, Div. of Plant Industry and by Dr. L. E. Allison, USDA.

AC

RAYMOND D. WALLACE, works manager of the Spencer Chemical Co., Henderson, Ky., has been named first vice-president of the Kentucky Chamber of Commerce. Mr. Wallace has been a regional vice-president of the chamber for the past two years.

AC

GEORGE M. BAILEY has been elected Vice-President of the Diamond R Fertilizer Co., Inc., Winter Garden, Fla. Mr. Bailey has been general manager of the company for the past seven years and will continue in that capacity also.

AC

THE R. F. STRICKLAND Co., Concord, Ga., has purchased the A. A. Britt Fertilizer Plant, Thomas-ton, Ga.

AC

J. GUY LA VERGNE has been named chief engineer for the Escambia Chemical Corp. in Pensacola, Fla. Mr. La Vergne joined Escambia in August, 1955, as chief design engineer.

AC

THE DIAMOND ALKALI Co., Cleveland, Ohio, has shown a slight gain in sales during the first quarter of 1957 over the same period last year. Earnings, however, have declined 18 per cent.

AC

MINNESOTA's Legislature has appropriated \$50,000 to permit detailed planning of a \$3,000,000 Crop Research Laboratory at the University of Minnesota.

AC

THE STAUFFER CHEMICAL Co., New York, has appointed C. D. Julien as assistant to the eastern sales manager, Agricultural Chemicals Division. Mr. Julien is located at Stauffer's eastern headquarters in New

York and is responsible for inventory control of both raw and finished materials and consigned stocks.

AC

HOOVER ELECTROCHEMICAL Co., Niagara Falls, N. Y., has declared a quarterly dividend of 25 cents a share on the common stock, payable May 29 to shareholders of record May 3. The company has also declared a dividend of \$1.0625 per share on the \$4.25 cumulative preferred stock, payable June 28 to stockholders of record June 3.

THE VIRGINIA-CAROLINA CHEMICAL CORP., Richmond, Va., reported a net income after taxes for the nine months ending March 31 of \$361,690, a drop of \$153,016 from the comparable period a year ago. The 1957 net is after deducting special items of a nonrecurring nature amounting to \$500,000 before taxes.

AC

W. R. GRACE & Co., is considering the erection of multi-million dollar chemical fertilizer plant in Trinidad.



New Modern Plant Where SER-X is Produced

SER-X is a potassium hydrous alumina silicate of the following analysis: SiO_2 73.08%, Al_2O_3 13.70%, Fe_2O_3 3.12%, TiO_2 0.54%, CaO 0.30%, MgO 1.14%, Na_2O 0.22%, K_2O 5.42%, Ign. Loss 2.54%, Fusion Point Cone 12.

Processed from Sericite ore, SER-X has an average particle size of 3.5 microns and a bulk density of 40 pounds per cubic foot. SER-X is inert, non-hydroscopic and non-shrinking. The particles are flat. Because of these physical and chemical properties it has proved ideal as a diluent in the formulation of agricultural insecticide dusts.

For Technical Literature and Samples, Write Dept. AC 1



The Test Proven
Insecticide Diluent

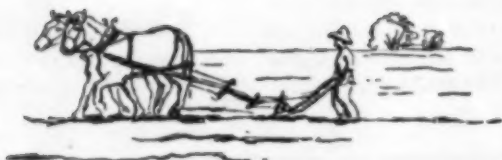
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Excellent Results

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BASHORE BUILDING

CARLISLE, PENNSYLVANIA



American Agriculture and Stauffer Grew Up Together



Many of the growers now feeding America are the sons and grandsons of men who used Stauffer Agricultural Chemicals more than seventy years ago. Today *both* American Agriculture and Stauffer are *big business* . . . both have long since outgrown knee pants.

Following the simple formula of *personalized, local service* Stauffer has grown to be the largest producer of agricultural chemicals in our nation, with manufacturing plants strategically situated in 48

locations from coast to coast. Fully staffed Stauffer Research Laboratories provide *local help to growers . . . devise local formulations for local problems!*

Take full advantage of the extensive Stauffer facilities. There is a Stauffer Technical Service Man in your area, working with your local dealer. Both are ready to help you.

Remember, it actually costs less to do business with the leader in the field.

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WASHINGTON REPORT

(From Page 70D)

through the general established county agent system, where one man serves thousands of farmers.

Key point in the Missouri program is that farmers in the group pay for a substantial part of the specialist's salary. When a man pays several hundred dollars a year for information, it's a lot different than being dragged away from his television set to a meeting down the road where he gets general information "for free."

Relating this situation to fertilizer, the basic move of the industry is to intensify information and demonstrations reaching farmers on the profitable use of fertilizer. The National Plant Food Institute has been moving in this direction for some time. As more of the plan unfolds in the months ahead, it will be more apparent why the June convention will be of such great significance.

* * * * *

Facts behind Secretary Benson's appearance on the Hill to toss the farm problem back to Congress is the increasing evidence that no one has yet found a cork to contain agricultural abundance. Fundamentally the Republican Administration of farm laws has been based on the philosophy that participation in acreage reduction programs should be voluntary, with payments to offset any loss to farmers. Everyone agrees this is a good theory.

Farmers, however, look at the matter quite differently. They are concerned, primarily, with making the best possible living for themselves and their families. As soon as the government sets a new series of ground rules on acreage and payments, individual farmers take this into account in planning operations, with the goal of making more money. Certainly everyone else in the United States acts about the same. As a result, despite the tremendous pressure on "give-away programs," foreign sales, barter, and other matters, we still have not dug out from under the mountain of surpluses which Secretary Benson inherited. Furthermore,

the way the farm program is now running, the reductions in the surplus pile he did make may well be counterbalanced, as bumper harvests come in this year.

Of particular interest to the agricultural chemical industry, however, is what happens under the government's acreage control programs?

While there are significant reductions in the acreage of crops under allotments, note how tremendously yield per acre increased in the tables,

on page 113. The second table lists those crops where acreage increased. Actually most of the diverted land was used for seven crops listed on the following page.

While the northeastern section of the country remains fairly stable under the government's acreage control programs, the midwest, south, and southwest show the most violent reaction. It is in the midwest, in particular, where the acreage devoted to "other feed grains" shows up sharply.



TOP: This 8'-0 x 60'-0 rotary dryer removes excess moisture and completes the granulation. Dryer is oil heated.

RIGHT: The lifters, with their unique cup-like design and their staggered arrangement in the unit, cause the granules to be evenly distributed.

A McDERMOTT 8 x 60 DRYER INSTALLATION AT THE
AMERICAN AGRICULTURAL CHEMICAL CO.'S SAGINAW PLANT

*Sound Engineering Economy and
Consistently Superior Performance
Are Built Into All McDermott*

DRYERS—COOLERS—AMMONIATORS

McDERMOTT BROS. CO.
Allentown, Pennsylvania

Now! More Technical Field Service from Du Pont



JOHN SPICER, JR., technical specialist for the southeastern states, with headquarters in Goldsboro, N. C.



OVE F. JENSEN will serve manufacturers in the midwestern states, with headquarters in Maple City, Michigan.



PHIL B. TURNER will provide technical counsel for plants in the Northeast, and will work from Wilmington, Del.

These specialists on **URAMON®** Ammonia Liquors are ready to answer your specific formulating problems

Du Pont expands technical service to fertilizer manufacturers to aid in formulating today's complex mixtures with "Uramon" Ammonia Liquors.

This field staff is an addition to Du Pont's technically trained sales force and many other service facilities. Manufacturers are invited to call on the technical experience and training of these specialists for at-the-plant advice on how to formulate properly with Du Pont UAL.

For further information on the formulations of UAL best suited to your use, and to request the services of this new specialist group, write:

*E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Department
Wilmington 98, Delaware*

HERE ARE OTHER IMPORTANT ADVANTAGES OF DU PONT **URAMON®** AMMONIA LIQUORS

- Safe in granulation . . . no danger of flash fires and less stack. Gives firm, uniform granules, which are best for storage and application.
- High-quality nitrogen from UAL resists leaching . . . supplies both urea and ammonium forms of nitrogen.
- Won't corrode regular fertilizer-manufacturing equipment, including ordinary steel and aluminum.
- Gives mixed goods better "feel"—minimizes caking, segregation and dusting.
- Prompt, dependable delivery enables you to schedule your production with confidence.
- Suitable for either batch or continuous mixing.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

URAMON®
AMMONIA LIQUORS

AGRICULTURAL CHEMICALS

	Harvested acreage (percent)	Total pro- duction (percent)	Yield per acre (percent)
Wheat, 1953 to 1955	—30	—20	+17
Cotton, 1953 to 1955	—31	—11	+28
Corn, 1953 to 1955	—1	(1)	+1
Rice, 1954 to 1955	—28	—17	+16

¹No Change.

	Harvested acreage (percent)	Total pro- duction (percent)	Yield (percent)
Oats	+4	+30	+25
Barley	+66	+61	—3
Grain sorghum	+105	+113	+4
Soybeans for beans	+26	+38	+9
Flaxseed	+10	+11	+1
Rye	+49	+61	+8
All tame hay	+3	+7	+3

It would seem that these farmer reactions to government acreage programs with the resulting acreage shifts would be of importance in planning production and marketing programs for agricultural chemicals.

Congress isn't likely to do anything about the Secretary's report this summer. The farm issue has been fought to a standstill during 1956, and the same basic elements are still there. The result is there is little likelihood of any major change in the farm program. The Secretary's appearance simply is an admission that what we have now is going to result in more of the same. Secretary Benson claims this is because his philosophy is hamstrung by Congress. Congress, on the other hand, claims the Secretary is at fault because he is continuously resisting the fundamental desires of Congress. Meanwhile, farmers are planting and getting ready for a big harvest.

* * * * *

How fares the family farm during this period? Here are a few facts that show many farmers have lots of purchasing power despite the drop in farm prices during the past several years.

1) Three-fourths of our farms today are operated by those who own them, the highest percentage on record.

2) Two out of three farms have no mortgage debt.

3) The percentage of farm production which comes from family-

sized farms has been practically unchanged during the past 15 years.

Point three needs a word of explanation and recognition of the fact that the family farm has increased in size and in dollars invested.★★

SACKETT GRANULATOR

(From Page 44)

niator is 7 feet in diameter and 7 feet long equipped with 15 H. P. variable speed motor. The rotary Sackett Star granulator is 6 feet in diameter and 8 feet long equipped with 10 H. P. variable speed motor. Vapors, principally moisture, generated by the chemical reaction in the ammoniator, are forced through a stack into the atmosphere by a suction fan equipped with 5 H. P. motor. Sometimes the mixture becomes too wet for rolling, and when this happens air is blown on the bed of material in the ammoniator to help in the drying. The fan used is equipped with 3 H. P. motor. A fair percentage of the granulation takes place in the ammoniator. The Sackett Star granulator helps considerably to give a greater proportion of on size material desired for the finished product, with a minimum of oversize and fines to be crushed and recycled.

(5) DRYING EQUIPMENT—The damp granules flow from the Star Granulator by chute directly into the dryer. The rotary dryer is 6 feet in diameter and 90 feet long and is driven by a 90 H. P. motor. A co-current 15 million B.T.U. two burner natural gas-fired combustion chamber feeds the hot gases thru the dryer. The first several feet of the dryer has directional flights to move the material away from the intake of dryer, and from this point lifting flights move the



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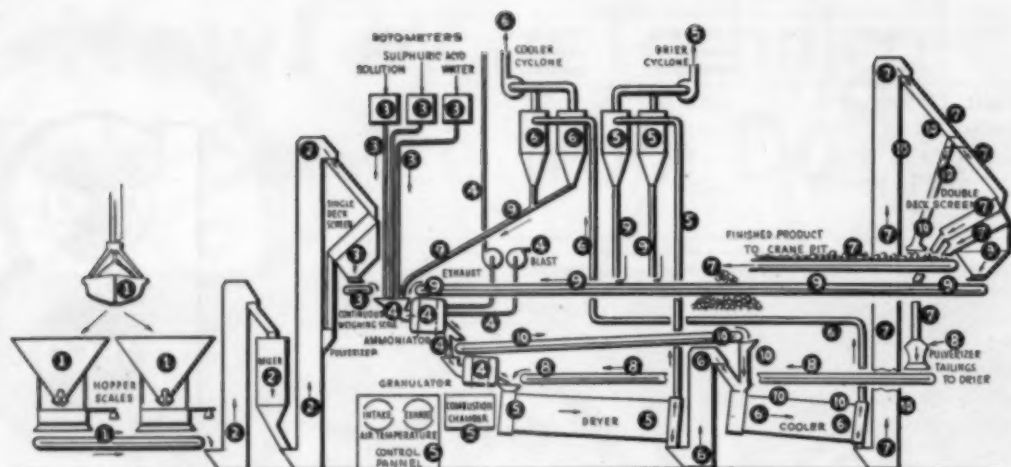
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Flow Sheet for fertilizer granulation at FMCI

material to the discharge end. Combustion air is furnished by a fan equipped with 20 H. P. motor. Moisture is removed from the dryer through a stack to the atmosphere. Dual cyclones recover the fine dust. A 75 H. P. motor is used to drive the cyclone fan.

- (6) **COOLING EQUIPMENT** — Material from the dryer empties into a vertical bucket elevator, which feeds the cooler. The rotary cooler is 6 feet in diameter and 40 feet long,

and is driven by a 40 H. P. motor. A counter-current air flow is used for cooling. The cooler flights are similar to the dryer flights. Additional moisture, during the cooling process is removed through the stack to the atmosphere. Dual cyclones recover the fine dust. A 60 H. P. motor is used to drive the cyclone fan.

- (7) **PRODUCT CLASSIFYING EQUIPMENT** — The cooler discharges onto a conveyor, feeding the material into a

vertical bucket elevator which lifts the product to a double deck 5' x 15' Tyler Hummer classifying screen. This screen gives 3 classifications: oversize, fines and finished product. The oversize passes thru a #15 Sacket double row hammer mill equipped with 15 H. P. motor. Crushed oversize can be returned to elevator leg for reclassifying or if too damp can be returned to dryer for more drying. The fines are returned via belt conveyor to the ammoniator and the desired product flows on a belt conveyor to storage pit for crane to pick up to store to desired bin.

- (8) **CRUSHED OVERSIZE**—When necessary to redry the crushed material from the pulverizer, the material is dropped on belt conveyor feeding directly into the dryer.
- (9) **FINES RETURNED FOR GRANULATION**—Fines from dryer and cooler cyclones and from classifying screen flow on conveyor belt back to ammoniator.
- (10) **AMMONIATING AND COOLING POWDERED MIXED GOODS**—Conventional powdered mixed goods are batch-weighed and the dry materials required for the formula are assembled and blended similar to the granular dry materials. The T. V. A. ammoniator is used for blending the dry materials with the required nitrogen solution. The granulator and dryer are not needed, therefore, this equipment is by-passed. The finished ammoniated powdered mixed goods flows from the ammoniator onto a conveyor belt emptying into the cooler. From the cooler the product flows onto a conveyor belt to a vertical elevator, by-passing the classifying equipment used for the granular product, delivering directly to the belt conveyor to take the product to the crane pit to be picked up by crane to deliver to desired bin storage.

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AGRICULTURAL CHEMICALS

FUNGICIDE TESTS

(From Page 55)

plus metal salts, and of other ethylenebis dithiocarbamates may greatly increase the incidence of grey mold and ground rot, while dichlorone, ferbam, and the methyl and tetramethyl dithiocarbamates in general give good control of grey mold. Thiram also gave the best control of *Rhizoctonia* fruit or ground rot. Plots were inoculated with a *Botrytis* spore suspension. (Table 61.)

Watermelon

DOWNY MILDEW, CERCOPOORA LEAF SPOT AND ANTHRACNOSE

A comparison of several liquid fungicides was made at Leesburg, Florida by Schenck and Crall in a field where mildew and cercospora infection occurred naturally and anthracnose was induced by inoculation. The best all round control and yield came from maneb. Tribasic copper sulfate caused slight burning. For grower trial, zineb, and maneb alternating with zineb are recommended. (Table 62.)

Cauliflower—seedbeds

WIRESTEM AND WEED CONTROL

In a preplanting single treatment comparison of six materials in New York made in early May, three weeks before sowing, Sherf found the best control of wirestem was obtained from Terraclor 75 at fifteen pounds active applied after seeding, and by eight ounces Calogreen in fifty gallons applied at 3.8 gallons per 100 square feet of seed bed. Methyl bromide even at three pounds, and Nemagon 10% at 340 pounds as well as Terraclor put on before sowing, were all unsatisfactory in their control of wire stem. Terraclor and Calogreen are currently recommended.

The best weed control was obtained in this experiment with methyl bromide, next best being Vapam and Nemagon, with Bedrench, Terraclor, and Calogreen third. Vapam and methyl bromide are recommended for this purpose. (Table 63.)

Gladiolus

DRY ROT (STROMATINIA)

Tersan was more satisfactory than Crag 974 (Mylone), or Vapam in field plot tests conducted at Washington State by Gould. Two applications of Tersan, totaling 350 pounds an acre in this artificially infested soil were better than 150 pounds of Mylone all in one application, but 300 pounds of Mylone was second place in yields, third in experimenters choice. Second choice was 100 gallons

TABLE 71

Control of Root Knot Nematode on Onions in New York Muckland (28).

Fumigant	Gals./Acre	Control Rating	Yield Rating	Exper. Pref.
DD	30	1	1	1
DD	40	1	4	2
Vapam	25	2	2	3
Dowfume W85	4 1/2	1	5	—

of Vapam drench. Crag 974 at 150 pounds and Vapam at 50 and 75 gallons were ineffective and all Vapam treatments could be phytotoxic if planting was done too soon. Only Tersan is recommendable to growers to date. (Table 64.)

Lettuce

SCLEROTINIA DROP

While something less than satisfactory control was obtained in Florida by Darby with four different fumigants, the best control was with two surface sprays of ferbam and Terraclor at thirty pounds per acre application. Fumigants employed were safe to lettuce, applied two weeks prior to transplanting, as was Terraclor, but N-521 at 168 pounds, and ferbam at sixty pounds were phytotoxic. The only increase in yield over check occurred where the urea-formaldehyde combination was employed. N-521 and Vapam have to be handled with caution. (Table 65.)

Oats, Barley, Wheat

SOIL BORNE FUNGI

Vapam and Wing-Stop B each at fifty gallons per acre were found more satisfactory than PCNB and American Cyanamid N. 8599 at fifty pounds per acre for control of cereal seedling diseases in greenhouse tests at Clemson, South Carolina, by Earhart. Materials were applied to soil prior to planting. PCNB was considered not worth further trial. (49.)

Potato

BLACK LEG

A forty pound (active) per acre application of PCNB (Terraclor) rotary tilled into the ground before planting in West Virginia caused a marked stunting of growth of the potato vines and a fifty per cent reduction of yield, according to Gallegly. (59.)

Parsnips

ROOT KNOT NEMATODE

In another comparison of DD, EDB and Vapam on muckland in New York, Sherf found when treatments were applied September 28, no phytotoxic symptoms developed on parsnips grown the next year. Vapam gave unsatisfactory control at sixteen gallons (64 pounds active per acre). First and second choice were DD at forty gallons and Dowfume 85 at four and one half gallons per acre which are recommended to growers. (Table 66.)

Peanuts

NEMATODES AND SOIL FUNGI

In a comparison of six soil fumigants by Lyle and Brogden at Headland, Alabama, first choice went to Nemagon. Satisfactory control was obtained with Dowfume 85 at 4.5 gallons and at three gallons; with D.D. and with Telone at twenty gallons; with Fumazone at 8.3 gallons, with Nemagon at 35 pounds per acre. Dordone and Fumazone at 12.5 gallons were unsatisfactory as were S-1295 at 14.5 gallons and Dowfume 85 at three gallons if the latter was improperly sealed. (Table 67.)

Lettuce

ROOT KNOT

In replicated small field plots on muckland in New York, three materials in powder or granular form were compared as surface applications double disced into the top four to six inches, followed in two weeks by seeding head lettuce. At harvest, knots on roots indicated no control from Crag 974 and only mediocre control from PRD and Nemagon. Reason, probably insufficient depth of application as knots were mostly below four or five inch level. (Table 68.)

TABLE 70

Summary of Nematode Populations in Plant Bed Demonstrations in North Carolina (37)

Treatments	Ave. No. of nematodes per pint sample*					
	Root Knot	Meadow	Stunt	Spiral	Dagger	Pin
Check	(3)333	(7)496	(7)725	(7)286	(2)138	(2)900
Methyl bromide	0	0	0	0	0	0
Check	(6)246	(11)378	(13)582	(14)320	(4)213	(4)1113
Bedrench	18	45	5	69	6	125
Check		(2)175	(2)488	(2)138		
AA: :D-D drench		0	38	13		
Check	(1)50	(1)50	(1)250	(1)125		(1)225
Allyl alcohol	25	75	150	75		150
Check			(1)425		(1)125	
Cyanamid plus EDB			0		0	
Check		(1)450	(1)2850	(1)100		
Steam		75	425	0		

*Number of locations for each check-treatment comparison is shown in ().

TABLE 72

Sclerotium rolfsii seedling disease control with PCNB mixed in the soil in the Philippines (63).

Soil Trtmt. 3 1/2" deep	Tom.	% Diseased Seedlings Egg Plant	Rice	Jute
Check	32	36	33	34
17 lbs./acre	16	18	17	15
34 lbs./acre	6	7	5	7
52 lbs./acre	0	0	0	0



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GYPSY MOTH

(From Page 50)

female cannot fly, but newly hatched larvae may be carried considerable distances by strong winds. Usually, long-distance spread occurs as a result of egg masses being carried on articles of commerce, such as timber, quarry products, Christmas trees, and nursery stock.

To effectively enforce quarantines, which regulate movement of products that may carry infestations, and to provide for treatment of infested materials so that they may move safely in commerce, surveys are constantly conducted to determine the extent of infestations. Sex-attractant traps are used extensively in current survey operations for determining distribution of the pest and for checking efficiency of control operations.★★

CANADIAN POTASH

(From Page 35)

take up the slack resulting from reduced domestic production. This new second source of potash on the American continent should now make us entirely independent of Europe, and guard against any repetition of the stringency which resulted in the 1949-50 period.

Over the long term, working of the rich Canadian potash deposits should also lend further stability to potash prices. The cost of potash to the American fertilizer manufacturer, incidentally, has been exceptionally stable over the past twenty years. The price today is essentially the same as it was twenty years ago,—36¢ a unit of K_2O , or \$21.60 a ton. During this same period the general level of all prices, and specifically of

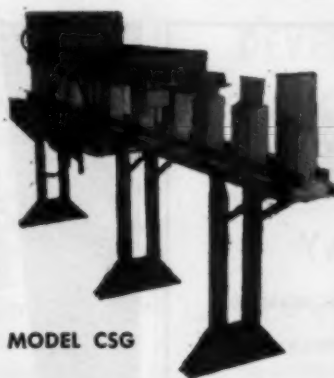
prices of many other chemicals, has advanced very substantially, yet potash prices have held steady. This has been made possible by a steady increase in output, with the economies of larger scale production causing relative production costs to drop. Domestic production in 1937 was in the neighborhood of 250,000 tons. Today it is eight times this total,—over two million tons of K_2O .

If potash producers were forced to continue to work the Carlsbad deposits alone, however, it is probable that potash costs would have to rise appreciably over the next twenty years, (as they may in any case) for it is typical of all mining operations in which natural resources are progressively exhausted, that as it becomes necessary to work lower grade deposits and narrowing veins of ore, costs mount. This could happen with another twenty years of working the Carlsbad deposits. The Saskatchewan deposits add an additional 100 billion tons to North American potash reserves, and guarantee not only that

the American fertilizer industry will have ample potash supplies for years to come, but also that it will not be necessary to work any lower grade or less productive ores.

There has been considerable speculation in the trade as to how production in Canada may eventually affect operations in the Carlsbad area. It is too soon as yet to know definitely, of course, and much still depends on how successful first commercial operations of Potash Company of America Ltd. are. If their experience is favorable when production starts next year, it has been predicted that in ten years fifty per cent of American potash requirements may be coming from the new Canadian source. Top officials of Potash company believe that production costs at the new Canadian operation will be quite favorable, and should help to offset added shipping cost to some areas in the U. S.

The southwest will, of course, always figure to take its potash requirements from the nearby Carlsbad facilities, and Carlsbad should also have



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a definite advantage costwise in shipping to the southwest. However, to many areas now supplied, transportation costs from the Canadian facilities will be no higher than at present. The mid west and the far west areas of the U. S. could be served from Canada on a comparatively favorable freight basis, and even on shipments to the northeast freight rates might not too severely handicap Canadian potash. It is anticipated that no more than 5 to 10% of the production from the Saskatchewan properties will find a market in Canada.

It is by no means anticipated that Canadian production will supercede the Carlsbad operations, but inevitably there will be some reduction in production in the Carlsbad area. However many companies have potash specialties which they make at Carlsbad, and it is anticipated that production of these specialties would continue there.

Saskatchewan has set up a three stage licensing system for the potash lands. The initial step for a potash

company desirous of operating in the area is to take out a withdrawal or exclusive license to prospect. Such licenses cover a six-month term and each covers a maximum of 100,000 acres. A company or individual can take out a number of such licenses. Rental is 1½¢ per acre for the period and there are no work requirements. Next step is the permit stage, with each company or individual being restricted to two permits covering a maximum of 100,000 acres each, at a 3-yr. rental of 5¢ per acre. The holder is committed to spending \$60,000 the first year and \$80,000 in each of the second and third years toward getting production started. Final stage is the production lease on a maximum of 25,000 acres. Rent is \$1.00 per acre per year for 21 years, and the lease is renewable. Holder of such a lease must have a plant completed within three years.

Potash Company of America, as indicated above, is much the furthest along toward production, with its shaft partly sunk and lined with con-

crete, the headframe erected and enclosed, and ready to start constructing its plant this summer. Continental Potash Corp. was the first company to start sinking a shaft, but its progress has been interrupted, and the shaft has not yet been completed. Most of the other major potash producers have holdings in the area, and while the majority of them are still in only the prospecting stage, several have progressed to the second or permit stage. National Potash Co. has one permit area, U. S. Potash and Borax Company has two permit areas and one withdrawal area. Duval Sulphur has two permit and two withdrawal areas, Campana Ltd. has one permit and one withdrawal area, General Petroleum of Canada has one permit area, and International Minerals has two permit areas.

Other companies holding withdrawal rights include International Potash Minerals Ltd., Saxon Mining Co., Southwest Potash Corp., Dominion Potash Ltd., Continental Geological Corp., Gordon Daly Corp., and

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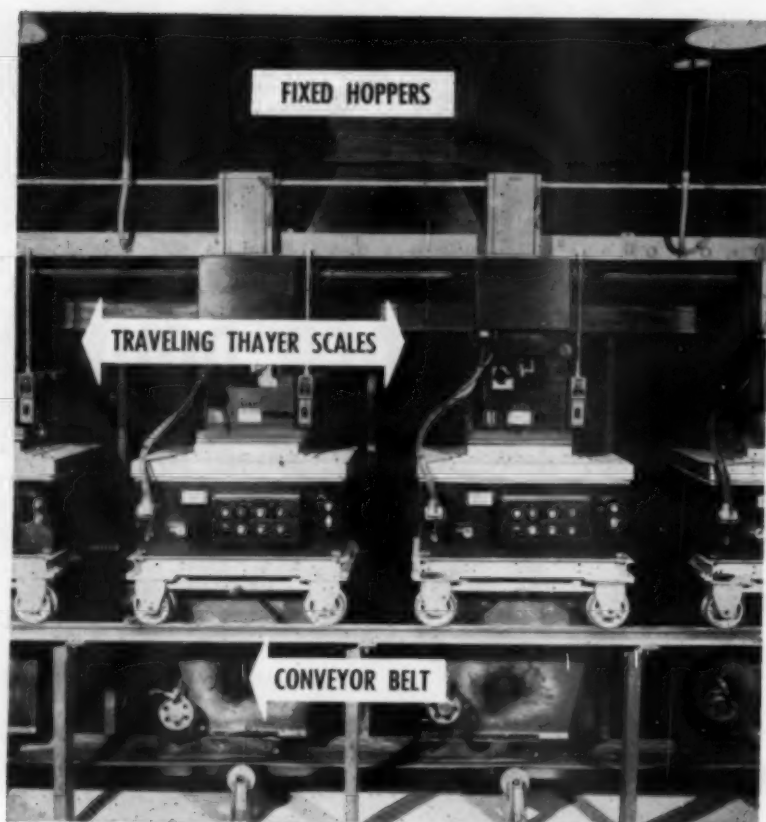
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S.A.M. Explorations Ltd. R. Campbell & Associates, Vancouver are also listed as holding three withdrawal areas.

The Potash Company of America Ltd. plant is to be constructed by Stearns Roger Mfg., Denver engineering and construction firm. When it is completed and in operation, sometime next year, potash users and producers as well will have a clearer idea of what to anticipate from this major Canadian development, and how important Canadian potash may be in supplying future needs of American potash buyers. Meanwhile officials of Potash Company of America are understandably somewhat reluctant to say too much as to their future plans pending completion of the proposed plant.

TETRAM

(From Page 41)

Low volume applications involving only 100-150 gallons per acre gave adequate commercial control in Texas. One good application per year seemed to be sufficient in these tests.

One low volume treatment at 400 p.p.m. prevented re-infestation of the citrus rust mite in Texas for 10 to 12 weeks, while high volume applications at 40 p.p.m. gave protection for three to four weeks.

In Cyprus, one application at 10 p.p.m. protected the plants from the citrus spider mite for two months. Similar results using 10-20 p.p.m. were obtained in Lebanon.

Both high and low volume applications controlled the citrus red mite and the Texas red mite in Texas. Eradication was virtually complete after 48 hours, and complete protection continued for six to eight weeks. Similar success against mites on citrus has been obtained in California, South Africa, and the Mediterranean basin.

During the last three years, analyses have been conducted in the fruit from all possible trial sites by chemists at the Yalding laboratories of Plant Protection Ltd., and in Texas a laboratory was set up staffed by two chemists from Yalding to test residues on cotton and citrus. These tests indicate that when Tetram is used in ac-

cordance with recommendations for rate of application and interval between application and harvest, it does not remain in or on the fruit in sufficient quantity to constitute a health hazard to consumers.

Plant Protection Ltd. expects that permission to market Tetram for use on deciduous fruit, cotton, and citrus will be obtained in most major countries of the world by the end of this year. Permission for unrestricted sale has already been obtained in Holland. The Ministry of Agriculture has given permission for Tetram to be used in the United Kingdom against red spider on apples. In the U. S., a temporary tolerance for its use on cotton has been granted by the Food and Drug Administration. Chipman Chemical Co., Bound Brook, N. J., is introducing the acaricide in this country under the name, "Chipman 6199."★★

BAYER 12/199

(From Page 37)

examination, on August 22, grubs were just beginning to appear, as five of the untreated animals were infested with a total of 33 grubs, on September 19 ten control animals were infested with 157 grubs, and by October 17 all the controls were infested.

The results of the experiment are summarized in Tables 1 and 2. Table 1 shows the maximum infestations found at any of the monthly examinations, and Table 2 the seasonal incidence of grubs in the various treatment groups.

Bayer 21/199 almost entirely prevented grubs from reaching the backs of the sprayed cattle; so the counts shown for that treatment represent total infestations. The most heavily infested animal had only three grubs, and it was easy to keep track of the individual insects. However, many of the ET-57-treated animals and almost all the controls had so many grubs in the back that accurate charting was difficult. From one monthly examination to another it was impossible to tell with complete precision when one grub dropped



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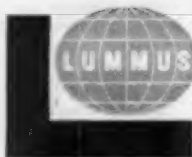


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from the back and was replaced by a new one in approximately the same position. Therefore, the counts shown in Table 1 for ET-57 and the controls merely represent the largest number of grubs found in each individual calf at one monthly examination. Thus, the highest count recorded for one calf might be in September and for another in October.

Table 2 shows that grubs first appeared about as expected in August, but the duration of the grub season was unusually long. In the control group new grubs were found each month from August through January. In February only a few old grubs remained in any of the cattle; so the test was terminated.

CONCLUSIONS. — Both of the ET-57 sprays failed to prevent migration of cattle grubs. The numbers of cattle were too few for us to determine whether there was any significant difference between the mean of 26.9 grubs per animal for the 14 treated calves and of 37.2

for the 11 controls. If there was a real reduction in population, a higher dosage of ET-57 spray might be more effective.

Both the emulsion and suspension of Bayer 21/199 were almost 100 per cent effective in preventing grubs encysting in the back. The average infestation in the 14 animals treated was 0.2 grub per animal, whereas the 11 controls had maximum counts averaging 37.2 grubs per animal. It seems evident that Bayer 21/199 applied dermally in advance of the grub season functions as a systemic insecticide to prevent subsequent damage. Therefore, further tests are underway to explore the practical value of the treatment and to check on any hazards.

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FERTILIZER VIEWS

(From Page 58)

his book. "Weeds, Guardians of the Soil." This author does point out of course that many common annual

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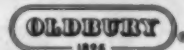
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weeds are not "constructively valuable in all situations. . . . Blind antipathy toward weeds will get us nowhere. But a sane study of the weed as a part of the law involved in the maintenance of soil fertility can be revealing to any open-minded person."

As I was about to conclude I ran across this other item just released by the U. S. D. A. It concerns "witchweed," a real serious threat to corn and other grass crops. This plant must be considered bad, since it destroys the roots of cultural crops by living on them parasitically. Witchweed is at present a scourge of corn and sorghum in South Africa and a serious pest of rice, sugarcane and other crops in the Far East. It could do more damage on corn than the corn borer, which now costs American farmers about \$80 million each year, if it is not scotched at once.

Weeds—friends or foes? Apparently, it all depends on the situation under consideration. Generally

speaking, "weeds" are unwanted on cropland and should be destroyed by every practical means. But as Cannourer points out, some "weeds" could be converted into worthy friends if intelligently utilized.

Chelating Agents

Reporting on chelating agents in the control of trace element deficiencies in plants, Harry Kroll and J. Powers, Olin Mathieson Chemical Corp.; A. Wallace and L. M. Shannon, University of California; and J. R. Kuykendall, University of Arizona reported that the problems which arise in the use of iron chelates of EDTA and related compounds on different soils have emphasized the need for better understanding of the chemical properties of these compounds and their interaction with the plant-root environment.

The binding of ferric iron by a series of polyaminocarboxylic acids (ethylenediaminetetraacetic acid, EDTA; hydroxyethylenediaminetriacetic acid, HEDTA; diethylenetriamine-

pentaacetic acid, DTPA; cyclohexane, 1,2-trans-diaminetetraacetic acid, CD-TA; Chel 138, a phenolic analog of ERTA) has been investigated, and the ability of these compounds to provide iron to plants grown on alkaline soils has been correlated with the stabilities of the iron chelates. The following reactions of metal chelates in soil are discussed. pH and hydrolysis, chelate fixation on soil, and trace-element interactions between chelating agents and soil.

Metal chelates, when applied to the soil, appear to be absorbed by the plant roots and translocated to the leaves where the metal is made available to the plant tissues. The physiological processes involved in the removal of the metal ion from the chelating agent is not known, but several possible mechanisms are presented. The chelating agent in the leaf tissue may participate in the mineral metabolism of the plant. A high concentration produces a phytotoxicity which appears to be a manifestation of induced trace element deficiencies.

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spread, regrowth . . .
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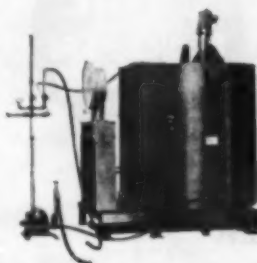
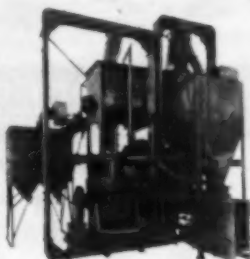
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INSECT REPELLENTS

(From Page 47)

emulsifiable sprays. And also like R-11 it is less toxic than pyrethrins to warm blooded animals. R-326 is compatible with insecticides commonly used. However, ordinarily when sprays containing R-326 are applied correctly, there is no need for combining it with insecticides. If fly populations are extremely heavy, they advise that a synergized pyrethrum spray be used in barns and other buildings to be treated to reduce the fly populations before applying the residual repellent spray.

R-326 has been registered with the USDA under the Miller amendment as a fly repellent for dairy or beef animals and as a premise spray. R-11 has been accepted by the USDA as a fly repellent on dairy cattle and has also been registered for use as a roach repellent. Tests will be conducted by MGK this season to determine the effectiveness of both products in increasing milk production and raising weight of treated cattle.

Repellents for Human Skin

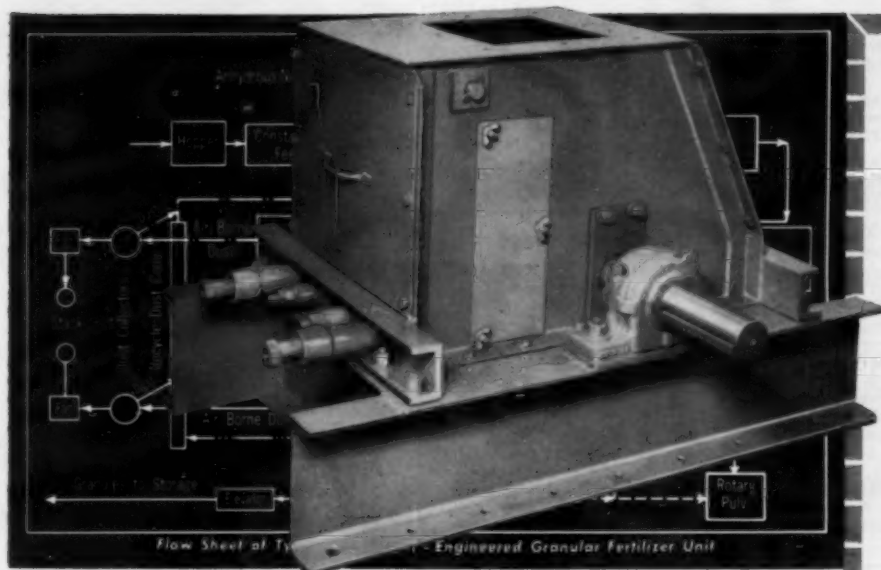
A PRODUCT of a somewhat narrower but nonetheless essential spectrum of application is diethyl toluamide, DET, which is apparently finding its prime use as a personal insect repellent. The product was developed some years ago by the U. S. Department of Agriculture, and only recently released for commercial production. Manufacturers include Hercules Powder Co. and Montrose Chemical Co., whose output is being distributed by R. W. Greeff & Co. Its outstanding property outside of repellency, is effectiveness because of its resistance to rubbing. Most repellents, when applied to the skin, are rapidly worn away by perspiration and normal activities of the wearer. A wipe test developed to measure this wearing off action showed DET to be at least twice as long lasting as the next best repellent. It appears to be better than any other repellent on the human skin.

A clear, oily liquid, diethyl toluamide occurs in three isomers: ortho, meta, and para. The meta form is about 10 percent more effective as a repellent than either the ortho or para form. On wiping and rinsing tests the meta isomer was found to have more lasting effectiveness than either of the other two isomers. The para isomer is irritating to abraded skin when present in excess of 25 per cent.

Formulators are advised that diethyl toluamide can be formulated in solvents, as creams, or as aerosols containing from 10 to 50 per cent DET. Isopropyl alcohol is reported as a satisfactory solvent for liquid formulations, and any cold cream or varnishing cream formula may be used as a base for incorporating this compound.

The first new consumer product employing diethyl toluamide on the market is "Off", which has just been introduced by C. S. Johnson Co. It is reported that the Johnson company has contracted for a very substantial part of Hercules Powder Co.'s anticipated 1957 production of diethyl toluamide. Hercules has announced, however, that 1957 supplies will be increased by meta Delphene production at the new plant in Brunswick, Ga.★★

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Allied Appoints Butler

Marshall W. Butler has been appointed manager of the South Point, Ohio, plant of Nitrogen Division, Allied Chemical & Dye Corp., New York. He succeeds C. W. Bahrt, Jr., who is transferred to the N. Y. office.

For Sale:

Pictures of Southern Insects, plant diseases or nematodes. Black and White or Kodachrome slides. Make your ads or sales folders live — use photographs. Lewis Maxwell, 506 Hollywood, Tampa, Florida.

Allied Ammonia Price Up

The Allied Chemical & Dye Corp., New York, will charge at least \$8 a ton more for anhydrous ammonia starting July 1 than it did a year earlier, according to an article in the May 28 issue of *The Wall Street Journal*.

Besides the rise on anhydrous ammonia, the paper said, higher prices have been set on ammonia and urea solutions for fertilizer use.

Other large producers of ammonia indicated they would "definitely follow along" with the advances announced by Allied's Nitrogen Division. They declined, however, specific comment at this time.

Sloan Is St. Regis V.P.

The St. Regis Paper Co., New York, recently elected Hugh W. Sloan a vice president of the company. He is continuing as vice president and managing director of the Canadian subsidiary.

O. K. Vapam For All Crops

Vapam, a soil fumigant, has been approved by the U. S. Department of Agriculture, for use on all crops. Previously, the compound has been sold only for application to seed beds, tobacco, ornamentals, and turfs.

EDITORIAL

(From Page 33)

It would seem to this observer to be unfair to the Benson program to jettison the soil bank at this early stage before it has actually been tested to see if it can make a real contribution to reducing crop surpluses. However admittedly there is a wide spread feeling among many congressional leaders that the cost of the soil bank is high compared with any good it may accomplish. With the present strong demand from taxpayers to cut government expenses, the soil bank may prove to be expendable.

With the wave of public enthusiasm for cutting the budget we are in complete sympathy. If the trend toward ever higher and higher cost of government is to be reversed, this can only be accomplished by courageously trimming every government function that is not absolutely essential. And there are plenty of such activities that we got along without for years and could just as well do without now. More pressure from taxpayers at this point is indicated to strengthen the public demand for insistence on governmental economy. A letter to your Congressman could help win this important battle.

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TALE ENDS

WE'VE known for a long while that they do things in a big way down in Texas. When they have a drought, it lasts for ten years—and when the drought ends they go all the way and have a flood or two. Folks in the insecticide business down that way may be pardoned if they get a mite discouraged. Now if the floods will just ease up for a spell so the cotton farmers can get a crop replanted, perhaps there will still be some business down that way this season.

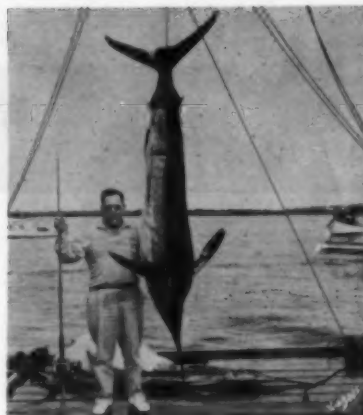
AC

If it isn't a flood, it can be a fire that complicates matters. Just as Monsanto was getting ready to put methyl parathion

over in a big way this season, fire wrecked their plant at Nitro, W. Virginia, and as we get the story it will be several months before the Monsanto facilities are back in full production again. Meanwhile, this seems to be one way, although rather a rigorous one, of heading off what had earlier promised to be an oversupply this season of one of most promising of the new cotton pesticides.

AC

W. R. Wood of Lubbock, Texas, who operates Wood Chemical Company in West Texas and New Mexico, is now more positive than ever that it is going to be a big year for insecticides. "Woody" spent 46 rough minutes land-



ing this 9 foot blue marlin off the west coast of Mexico, and he thinks it is a sure sign that the big fish means a big season, especially with Texas getting almost as much rain as there is water in the Gulf of California.

AC

Who said there is nothing new under the sun? Olin Mathieson is reportedly marketing a fertilizer with a minty aroma. They are packing two types of "Plantron" plant food—one with and one without the aromatic ingredients, the perfumed variety at a modest premium. We'll be interested in learning how it sells.

AC

More on aromatics in fertilizer: Dodge & Olcott, Inc., New York, in the May issue of their monthly bulletin D & O News, discuss the use of masking aromatics, and report work has been done on this problem for a number of concerns by the D & O Labs. They say they have satisfactorily masked sulfuric acid in fertilizer, using odorants in proportion of as little as 1/50% and point out that price does not preclude the use of aromatics on a wide scale in the industry.

AC

Fertilizer sales have suffered this spring because of the unusually wet weather in some areas. April sales are reported to have been about 10% below the '56 level because fields were so muddy growers couldn't get in to spread fertilizer. As a result, price cutting has been reported by dealers in the midwest and the southeast.

AC

There has been a big commotion in the New York newspapers over the past few weeks over the gypsy moth spray program, with a number of feature writers who would obviously be much more at home writing sports or pithy items for the women's page unlimbering their typewriters to warn against the carnage that may result from the DDT applications. Even the normally stable and non-alarmist New York World Telegram went so far as to dust off the eminent and often-quoted Dr. Biskind and trot him out for a stern warning on the dangers of DDT poisoning. Some of the edge was taken off the story when the Public Health Service, the Department of Agriculture and the Fish and Wildlife Service came out with a joint statement discounting the possible hazard.

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